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STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

RULES AND REGULATIONS REGARDING CONDUCT OF GAME
WARDENS IN ATTENDANCE, CARE OF GROUNDS, BUILDINGS,
ETC., AT INDIANA DEPARTMENT OF CONSERVATION
TRAINING SCHOOL.

The Fish and Game Division of the Indiana Department of Conservation has developed a very efficient field staff composed of men who are vitally interested in wildlife restoration. Apparently nowhere else are the fish and game laws better observed or general wildlife administrative activities better conducted.

However, as the work of the Department has expanded and the number of hunters has increased the problems of fish and game administration have become increasingly complex and accordingly the need for efficient, interested and experienced game wardens has become more and more evident.

The former system for selecting regularly employed field personnel was in itself a decided advance over the methods ordinarily in vogue but, with experience, this method has not proved entirely satisfactory. The need for a new and more efficient method of handling the entire problem has become obvious.

After several months of detailed study the Department has decided upon the establishment of a Training School. The new method of selecting and training such field officers is briefly outlined below.

1. To assure fully qualified and trained officers in all branches of the field service.
2. To increase general efficiency in fish and game protection and management throughout the state.
3. To reduce administrative costs below those to be expected when untrained personnel is employed.

In the operation of a school or any group gathering there is a definite need for specific rules and regulations to insure a uniform course of procedure and to eliminate irregularities. Therefore, the Department has prescribed the following rules and regulations for wardens during the school term.

A.

GENERAL INSTRUCTIONS

1. No one from the school will be allowed to visit the hotel except at meal time or leave the park property without written permission from the Superintendent of the Training School.
2. All trips off of the park property shall be reported on leaving and returning and a written report of each trip shall be kept in the office of the Superintendent.
3. Intoxicating liquors are not to be used and are absolutely forbidden to be brought within the park boundary.
4. No Game Warden shall be permitted leave of absence during the three weeks training period.
5. The School facilities being inadequate to lodge and provide subsistence for relatives and friends, and the nearest town, Spencer, being approximately two miles distant, such visitors should plan their trips to the

School accordingly. It is necessary to limit the visiting hours to Saturdays between 1 to 5 P.M. and on Sundays, between 2 to 5 P.M. Relatives and friends should be notified of this ruling.

6. Each enrollee of the school is expected to be clean and well shaven at all times.
7. Punctuality is important, each man is to report promptly for classes and all other activities.
8. The seating arrangement during instruction periods shall be in the same numerical order as the assignment to quarters, and shall begin to the right of the Superintendent. The same seating arrangement shall be followed during the entire training period, unless it is deemed advisable by the Superintendent to change the plan.
9. Lights shall be extinguished at 11 o'clock and all conversation and noise shall cease.

B.

CONDUCT DURING MEALS

1. Upon call to meals the men will assemble promptly in front of the administration building where dress inspection will be held. After inspection the men will form in line, double file, in the order of their numerical assignment and shall march to the dining hall. Upon reaching the hotel the group shall enter the building in single file.
2. Each man shall take his position promptly at the dining table as assigned at the beginning of the school, and shall remain standing back of his chair until all are seated by the Superintendent.
3. When guests are present they shall be seated to the right of the Superintendent, and the men will, therefore, be required to change their seating arrangement to adjust the situation.
4. Enrollees shall appear at all meals in a presentable manner. The prescribed Game Warden's uniform shall be worn at all evening meals at the Training School, on Sundays, and on such special occasions as may be designated by the Superintendent.
5. All members shall remain seated at the table, unless excused, until the entire group has finished the meal, when all will be excused from the dining table upon signal from the Superintendent or the Assistant Superintendent. They shall then file out of the dining hall and return to the training school property in the manner above described.

C.

CARE OF EQUIPMENT

1. Each man upon arising, shall air his bed in a thorough manner, by turning the sheets over the end of the bed, and unless prevented by inclement weather, will be required before assembly to air his blankets on the outdoor line provided for that purpose.

2. Before classes on week-days and immediately after breakfast on Sundays, each man shall make his bed in the manner prescribed by the Superintendent.
3. The Superintendent shall prescribe regulations covering the storage of suitcases, traveling bags, etc., the arrangement of clothing, uniform equipment, and personal effects.
4. Each man, upon completing his toilet, shall leave the bath and shower rooms in a clean and sanitary condition by placing the refuse in conveniently located receptacles.

D.

CONDUCT DURING INSTRUCTION PERIODS

1. The School is being conducted in a non-partisan manner. Discussions should be frank, but personal differences and criticisms shall not be introduced.
2. No discussion shall be permitted on irrelevant topics, the discussion being limited solely to the subject under consideration at that time.
3. It is impossible to give recognition to more than one speaker at a time, and any person desiring to raise a question shall address the chair with the word "question".
4. Students shall not be permitted to talk or discuss subjects among themselves during the instruction period, nor to assist another person in replying to questions.
5. A strict, quiet, attentive attitude must be maintained.
6. No smoking shall be permitted during class periods, excepting in special cases where approval will be given by the Superintendent.

E.

DETAILS AND SPECIAL ASSIGNMENTS

1. Various Details will be necessary from among the men to perform the duties connected with the operation of the School. Their appointments from time to time, and their prescribed duties shall be covered by the Superintendent in Training School Orders. Every man shall immediately, upon special assignment, discharge any duty assigned him by the Superintendent or Assistant Superintendent.
2. Each man in attendance is appointed a "Committee-of-One", and shall be responsible for the clean and sanitary condition of the entire grounds and buildings.

F.

COURTESY - DISCIPLINE

1. The men are required to obey strictly and execute promptly the lawful orders of their superiors. Authority will be exercised with firmness, kindness, and justice.
2. In the interest of group harmony and efficiency, discussions embodying comparisons between individuals, their qualifications and abilities; statements of a

ensorious nature pertaining to superiors, the department's policies, or other law enforcement agencies or their members; and criticism of a nature that will injure the morale or impair the efficiency of the organization will not be permitted.

3. While maintaining discipline and the thorough and prompt performance of duty, officers in authority shall not be abusive or conduct themselves in a manner that will lessen the initiative and self-confidence, or impair the self-respect of wardens.
4. The status and activities of men change greatly upon entering the service of this Department, or that of any enforcement or military organization. Discipline and obedience are necessary, but loyalty and cooperation also, between superiors and subordinates, are vital to the Department's efficiency. Loyalty of the men to their superiors and of the officers to the men and an appreciation of personal problems, one for the other, will engender a friendly relationship. This sort of spirit is to be encouraged without fear of relaxing the bonds of discipline necessary.

G.

ORDERS AND REGULATIONS

1. A Bulletin Board shall at all times be maintained, on which will be posted Departmental Orders and Training School Regulations, Bulletins, Detail Assignments, and other information of educational and advisory nature. Each man should consult the bulletin board frequently, and review same carefully from time to time in order to be thoroughly informed regarding the material posted thereon.
2. The Department reserves the right, and the Superintendent of the Training School is empowered to dismiss a man at any time, for insubordination, failure to meet required standards, or because of being diseased, and for possessing or bringing within the park boundary any quantity of intoxicating liquor.

H.

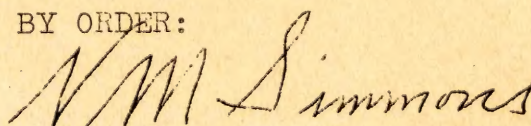
DISCIPLINARY ACTION

The Superintendent, Assistant Superintendent or any man who fails to follow the established regulations shall be immediately suspended, and upon proper investigation made, shall be subject to such disciplinary action as the Commissioner shall determine to be fitting.

EFFECTIVE DATE

These instructions and regulations shall become effective immediately.

BY ORDER:



V. M. SIMMONS
Commissioner

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

UNIFORM AND EQUIPMENT REGULATIONS

I. DRESS UNIFORM AND EQUIPMENT:

The dress uniform and equipment of Indiana Game Wardens shall consist of: Service coat, breeches and cap of forest green, Sam Browne belt, holster and black, lace, high-top shoes, regulation shirt, black four-in-hand necktie, (not to exceed $1\frac{1}{2}$ " in width), revolver and two badges.

The warden will furnish all of the above equipment, except Sam Browne belt, revolver and badges.

Regulations adopted for use of this equipment are:

- a. The cap shall be worn straight.
 - b. The service coat shall be kept properly buttoned.
 - c. Pistol to be carried on the left side of the body. If hand-cuff case is worn, it shall appear on the left side of the body attached to the belt. The shoulder strap must be worn with dress uniform.
 - d. Insignias: Shirt and service coat should bear the Department's insignia on the left arm of the garment. The badge to be worn on the flap of the left breast pocket, and no badges or insignia except those furnished by the Department shall be worn unless it be a badge indicating federal authority. Service insignias may be worn but shall be attached only to the left sleeve, above the cuff line.
 - e. Dress uniforms shall be maintained in good condition, shoes polished, and entire uniform neat, clean and pressed at all times.
 - f. The dress uniform and equipment need be worn only at Divisional or other designated meetings, funerals, sportsmen's meetings, or other public functions, where the warden represents the Department in an official capacity.
 - g. At seasonal periods the Department may order the abandonment of certain parts of the uniform, but in no case will substitution of clothing or non-uniformity of officers be permitted. Upon specific instructions of the Department, during extremely hot weather, the service coat may be abandoned.
 - h. In the absence of specific instructions in regard to uniforms or equipment, take the complete uniform to the meeting place, and then inquire of the warden captain as to uniformity.
- Where more than one Division is represented at a meeting, the respective captains shall confer and agree upon abandonment in ample time to inform the officers under their separate jurisdictions, thus assuring complete uniformity.

II. FIELD UNIFORM:

The field uniform shall consist of: Cap, regulation shirt, blouse and breeches of forest green, black, lace, high-top shoes, black four-in-hand necktie, Sam Browne belt, holster, revolver, and two badges.

The Department will furnish all of the above equipment except ties and high-top shoes.

Regulations adopted for the use of this equipment are:

- a. The uniform should be worn at all times for general work in the field, with the exception of such times when the class of work or nature of the investigation being done would be destructive to the uniform or seriously interfere with apprehension of violators.
- b. The service uniform should never be worn when attending special, social or business functions as outlined under dress uniforms.
- c. The same care and condition shall be maintained of the field uniform as specified for that of the dress equipment.
- d. The same regulation affecting insignias will be enforced as outlined regarding dress uniforms, except that the shoulder strap of the Sam Browne belt shall not be worn with field uniforms. (Belt to be worn on outside)

III. CONDUCT WHILE IN UNIFORM:

Remember that you are an officer of the state and a direct representative of the Department. Keep your uniform and equipment neat and pressed, and your leather equipment polished. Show your respect for the uniform and the organization you represent. Your conduct and manner are judged by all those with whom you come in contact. Be courteous in replying to inquiries always. Guard your remarks and speech. False impressions must be guarded against constantly.

IV. INVESTIGATIONS:

In making special undercover investigations, the use of civilian clothing is permitted, but bear in mind that the use of uniforms and strict adherence to these regulations is desired.

V. CONDEMNATION OF UNSERVICEABLE CLOTHING:

The service uniform and equipment furnished you is the property of the Division of Fish and Game and reasonable care is expected. Depreciation is anticipated and replacements will be considered only as needed.

A. Proceeding for Condemnation:

Any officer requesting condemnation of unserviceable equipment shall make application to the Superintendent of Wardens for its renewal. If equipment has not been in use a reasonable length of time an explanation should accompany the request for renewal.

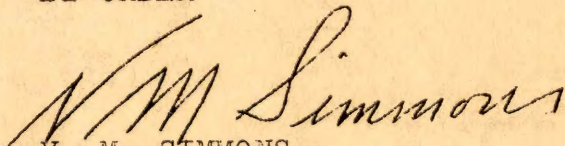
VI. EQUIPMENT FROM RESIGNING OFFICERS:

- a. Any officer leaving the service for any reason shall, before finally receiving monies due him, return all clothing and equipment in his possession which is owned by the Department.
- b. Any officer upon leaving the service of the Department, and who shall have lost any part of the equipment assigned to him, shall make payment for the same at market price, in exact kind, color and style, before final monies due him shall be distributed.

VII. INSPECTION:

- a. Inspection of officers and equipment shall be made at such times and places as administrative officers shall direct, with or without advance notice to officers.
- b. During the attendance at the Training School for instruction purposes, the Superintendent of that institution shall cause an inspection to be made each day before dinner and shall insist that the men appear for inspection in full dress uniform. Service uniforms or civilian clothes may be worn during the day as desired.
- c. Captains will be held equally responsible for non-uniformity, substitution, or unsightly appearance of both the dress and field uniform of the wardens in their districts and will be subject to such disciplinary action as may be required in each case.

BY ORDER



V. M. SIMMONS
Commissioner

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

1. DEPARTMENT OF CONSERVATION - ORGANIZATION, POWERS, DUTIES,
AND FUNCTIONS.

A. ORGANIZATION.

The Department of Conservation was created by an act of the General Assembly of Indiana in 1919. The powers and duties of the Department of Conservation was vested in a Commission, consisting of four members appointed by the Governor. This Commission held periodic meetings, and received no compensation, except travelling expenses and ten dollars per day for the actual time that they spent in meetings. The Commission was empowered to appoint a Director, who had immediate supervision and charge of the functions and operation of the Department of Conservation. The Director was responsible to the Commission and served at the pleasure of the Commission.

In 1933, the Indiana General Assembly passed an act known as the State Reorganization Act, which created eight departments of government. By this act the state government was completely reorganized in eight divisions, one executive and seven administrative, with the intent that these divisions would exercise all of the executive and administrative powers, duties, and functions connected with the successful operation of the government of Indiana. This act granted the Governor the power to transfer or re-transfer any administrative powers, duties, and functions to any one of the eight departments, thus centralizing and concentrating all government functions in these eight departments. Each of the seven administrative departments is in charge of a Board.

One of the eight divisions of government created by the State Reorganization Act is the division or Department of Public Works. To this department, the Governor transferred all the powers, duties, and functions of the Department of Conservation, the State Highway Commission, the Excise Director, the Board of Public Printing, the Board of Public Buildings and Property, and other minor commissions. The transfer of the functions of the Conservation Commission created by the act of 1919 abolished this Commission.

The Department of Public Works, to which division the powers, duties, and functions of the Department of Conservation were transferred, is in charge of a Board, consisting of the Governor, Lieutenant-Governor, and three other members appointed by the Governor. The internal organization of the Department of Conservation remained practically the same, and the legal result was that the various officers and employees of the Department of Conservation were responsible to the Department of Public Works rather than to an independent commission, as they were under the 1919 act.

The Governor, under the Reorganization Act, appointed a Commissioner, who functions as the chief administrative officer of the Department of Conservation in the same manner as did the Director under the old organization. His duties are not defined by statute, but he is directly responsible to the Governor for

the operation of the Department of Conservation. The legal relation of the Department of Conservation with respect to the Department of Public Works is comparable with the legal relation that existed between the Department of Conservation under the act of 1919 and its six divisions. In the eyes of the law, it is just a division of the Department of Public Works.

B. POWERS, DUTIES, AND FUNCTIONS.

One of the specific powers of the Department of Conservation was to make rules and regulations concerning the functions and operations of any of the six divisions. These regulations, when signed by the Governor, printed, and twelve copies distributed to the county clerk, have the force and effect of law, and it is a crime to violate such regulations.

The department of conservation has specific authority to investigate and make recommendations concerning natural resources, flood prevention, forest culture, plant diseases, and diseases of bees, and other allied subjects.

The specific power to cooperate with agencies in work of joint interest may be exercised by the Department of Conservation.

It has the power of eminent domain; that is, it may condemn private land for use as state forests and state parks.

The chief administrative officer of each of the six divisions of the Department of Conservation has power to execute warrants and processes.

The Department of Conservation receives a biannual appropriation. The Commissioner in charge of the Department of Conservation allots each division a part of this appropriation for that division's expenses of operation. Only five of the six divisions receive part of the biannual appropriation. The Division of Fish and Game, including wardens salaries and all activities of that department, is supported entirely by license fees and a part of the costs which are assessed on each conviction of violation of the fish and game laws.

C. DIVISIONS OF THE DEPARTMENT OF CONSERVATION.

The Department of Conservation, as it was organized, consisted of six divisions: Geology, Entomology, Forestry, Lands and Waters, Fish and Game, and Engineering. Under authority of the 1919 act, a new division was created in 1934 known as the Education Division. Each of these divisions are in charge of a Director, who correlates and directs the activities of that division.

The various powers, duties, and functions of the six divisions will not be discussed here. The game wardens are primarily concerned with the operations of the Division of Fish and Game. The powers, duties, and functions of this division as defined by law are as follows:

1. To examine the various lakes, rivers, streams and water-courses in this state and ascertain whether they can be rendered more productive in the supply of fish, and what measures are desirable and expedient to effect this object, either in propagating and protecting the fish that at present frequent the same or in the selection and propagation of other species of fish therein, or both.

2. To inquire into and test the best modes of the artificial propagation of fish in the various waters of the state, and procure and superintend the procuring of such fish, fish eggs and spawn as shall be necessary for said waters and the propagation of same therein.

3. To inquire into the best methods of preserving and propagating the game, game birds and song birds now in the state, and introduce such varieties of game and game birds, foreign to the state, as may be deemed for the best interests of the people of the state.

4. To take, or cause to be taken, any fish or game, in any manner and at any time, for the purposes connected with fish and game culture, protection, preservation or propagation of fish and game, or with scientific observation.

5. To acquire lands or water and build or acquire the necessary equipment for the propagation of fish and game, and to engage in the propagation of such species of fish and game as the commission may determine to be for the best interests of the state.

6. To see that all laws for the protection of fish and game are enforced, and institute proceedings for the punishment of any person or persons violating said laws within the state of Indiana.

7. To encourage and assist, in so far as is consistent with this act, the organization and establishment of fish and game protective associations in the several counties of the state, to the end that the work of the conservation department and the laws of the state relating to the propagation and conservation of fish and game may be made more effective.

In addition to the above enumerated powers, the Division of Fish and Game has been specifically granted additional powers, duties, and functions under the recodified Fish and Game Laws enacted by the Indiana General Assembly of 1937.

Not included in the seven specifically enumerated powers above is the 1927 act which granted to the Department of Conservation the charge, management, and control of all unsold lands bordering upon or lying adjacent to any lake or stream.

In Part I., an attempt has been made to briefly outline the powers, duties, and functions and the organization of the Department of Conservation, and more specifically the Division of Fish and Game as defined by law.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

This list of "Things to Remember About Indiana" is merely the nucleus of what we believe will eventually make a valuable, handy reference. Please feel free to remind us of items which have been omitted. Your suggestions will add to the usefulness of this circular.

Antelope, Inhabited the prairie regions of early Indiana
Apiaries, State Entomologist to supervise (1909)
Area, Indiana - 36,354 Square Miles

Bear, Nearly as numerous as deer in early Indiana
Beaver, Still found and are protected in Indiana
Bird Banding, U. S. Biological Survey supervises banding and keeps all records.
Birds, Unprotected - (English Sparrow, Crow, Great-horned Owl, Coopers and Sharp-shinned Hawks, and Starling)
Bobcats, Very plentiful in all sections of early Indiana
Bounties, Provided only by County Commissioners.
Buffalo, Numerous in early Indiana

Carp, Introduced in this state (1884)
Clubs, In 1933 Indiana had 106 clubs of which 51 were active. Membership 5,380 only 38 counties.
Clubs, In 1937 Indiana has 664 Clubs covering every county.
Coal, First discovered in Indiana by Col. Croghan (1763 - Wabash River)
Coal, Newspapers of 1832 carried ads covering the sale of Hoosier coal.
Coal, First shaft sunk in Indiana (near Newburg 1850)
Coal, To date approximately 1,350,000,000 tons have been mined or rendered unworkable in Indiana
Commissioner of Fisheries, (Indiana's first - September 1881)
Commissioner of Fisheries and Game, (Indiana's first - February 1889)
Corn borer, European - First found in Indiana (Steuben County August, 1926)
Corn borer, Established station at Auburn in October, 1936
County Road Supervisors, Enforced fish and game laws prior to 1897.
Counties, Indiana has 92
Crows, The 128 clubs participating killed 116,891 Crows in 1934 & 35.

Deer, Very plentiful in Indiana at one time. (supply fell off after 1840)
Deer, First protection in this state February 26, 1857 - (closed season January 1 to August 1)
Dutch Elm Disease, First discovered in Indiana - 1934
Indianapolis

E. C. W. (C. C. C.) entered Indiana in 1933

Eagles, Are protected by Indiana laws.

Eggs in average clutch; Prairie Chicken 7 to 12 - Incubation period 21 to 23 days

" " " " Pheasant 7 to 16 - Incubation period 23 to 24 days

" " " " Hungarian Partridge 8 to 24 - Incubation period 23 to 24 days

" " " " Bob-white Quail 8 to 25 - Incubation period 21 to 23 days

" " " " Wild Turkey 10 to 18 - Incubation period 27 to 28 days

Eggs, The department distributed over 60,000 eggs to clubs for hatching in 1936.

Elk, Quite common in early Indiana

Entomologist, Office created in Indiana (1907)

Fish, First laws in this state for protection. (Net regulation 1850)

Fish, Bag and length limits declared (1899)

Federal forest fire and nursery law - (Clark McNary Act 1925- Approved by Indiana 1929)

Forest classification law, (Indiana's first - 1899)

Forest classification law, (Present act passed - 1921)

Forest, State - (Indiana's first - Clark County, 1903)

Forests, Chief values of (Timber, water saving and flood prevention, erosion control, wildlife, recreation)

Forest Fires, (Indiana's first law - February 27, 1905)

Forestry Board, State - (Indiana's first - 1901)

Forestry Fund, (LaFuze Act - $\frac{1}{2}$ mill tax passed in 1924)

Forestry Fund, (Increased to a 1 mill tax in 1927)

Forestry Fund, (Increased to a 2 mill tax in 1929)

Fur industry, Indiana yields nearly a million dollars in raw furs annually

Fur, Muskrats provide Indiana's principle pelage.

Flushing bars save much wildlife - Encourage their use

Game Farm, State - (Indiana's first - Jasper-Pulaski purchased 1930.)

Gas, Natural - (Howard County 1885 produced Indiana's first commercial quantity)

Gas, Natural - (Peak of production reached in 1900 - Value of gas sold \$7,255,000.)

Geologist, State - (Indiana's first - David Dale Owen 1837)

Geological Survey, (Indiana's first - 1839)

Gestation Period - Bear-7 months - From 1 to 3 young - average 2

" " Beaver-3 months - From 2 to 5 young - average 4

" " Deer-205 days - From 1 to 3 young - average 1.5

" " Fox-51 days - From 4 to 9 young - average 5

Gestation Period - Mink-42 days - From 4 to 8 young -
 average 4
 " " Opossum-13 days - 18 embryos, accomodation
 for 12
 " " Rabbit-28 days - From 3 to 7 young -
 average 4
 " " Raccoon-63 days - From 3 to 7 young -
 average 4
 " " Skunk-63 days - From 3 to 8 young -
 average 5
 " " Squirrel-44 days - From 3 to 4 young -
 average 4

Habitat, Pheasants and quail are not adapted to the same
 environment

Hatchery, State Fish - (Indiana's first - 1912)

Hawks, All protected except Coopers and Sharp-shinned species.

Highest point in state, (Randolph County, 1285 feet above sea
 level)

Ice fishing, Prohibited only on Bass Lake, Starke County.

Indiana settled by French, Vincennes 1702

Indiana, Meaning of name - "Indian's Ground."

Japanese Beetle, First found in Indiana - Indianapolis 1934

Kankakee, Drainage started in 1900

Lake Michigan, Indiana owns and controls 230 square miles

Lakes, There are more extinct lake beds in Indiana than
 existing lakes

Lakes, Indiana has 1036 named ponds and lakes of one acre or
 more

Lakes, (Tippecanoe - deepest in Indiana - 121 feet - 1900)

Lakes, (Wawasee - largest in state - 3622 acres)

Laws, Game - (Indiana's first protection - February 26, 1857)

Licenses, (Part of funds from license sales set aside for
 fish and game - 1907)

Licenses, Revocation of (New penalty for violation of fish
 and game laws - 1935)

Litters per year, Rabbits may have 3 litters

Litters per year, Squirrels often have 2 litters

Lowest point in state - (Posey County near Niederst - 313
 feet below sea level)

Mobility, Quail - Daily maximum $\frac{1}{4}$ mile - yearly maximum $1\frac{1}{2}$ mi.

" Pheasant " " 2 miles " " 15 mi.

" Hungarians " " $\frac{1}{2}$ mile " " 1 mi.

Muskellunge, (Are caught in Indiana waters)

Mussels, Thriving business in Indiana

Nurseries, In 1936 the Entomology Division inspected 560 private enterprizes

Oil, (Two unsuccessful wells were drilled in Crawford County before 1865)
Oil, (Indiana's first commercial quantities - Trenton field, Vigo County, 1899)
Oil, (This state has produced over 120 million barrels.)
Oil, (Peek production in 1904 - 11,339,000 barrels)
Otter, Indiana trappers once took them in large numbers.
Owls, All protected but Great-horned species.

Panthers, Very plentiful in early Indiana
Partridge, Hungarian - Introduced here in 1909.
Pheasants, Bottom-land birds, not like quail and other up-land species
Pheasants, First introduced by the state in 1899.
Pheasants, First eggs given to clubs by Department 1927
Pheasants, Hen pheasants lay an average of 50 eggs each season at the game farm.
Pheasants, 7,387 were released in Indiana in 1932 (Over 21,000 were released in 1936)
Pheasants, Indiana's first open season on cocks in 1936
Population of Indiana, 1930 census shows 3,238,503
Predatory fish, Department removed 5,308 in 1932 and 3 clubs removed 1,431 that year.
Predatory fish, (In 1934 & 1935 the spearing clubs removed over 93,500)

Quail, Only 431 were released in Indiana in 1932. (Over 23,000 were released in 1936)
Quail, (First protection in Indiana - closed season February 1 to October 1 - declared February 26, 1857)
Quail, (Law of 1867 made it unlawful to trap or net - fine \$2.00)
Quail are upland birds, They do not inhabit the game territory as pheasants
Quail, Cocks will incubate eggs and often make better parents in caring for young than hen birds
Quail, Hen quail will lay an average of 60 eggs each season at the game farm
Quarantine, Promulgated to prevent the spread of destructive insects in 1933

Rabbits, Were not plentiful in early Indiana.
Rabbits, Increased in Indiana with the clearing of the land.
Rearing ponds, In 1936, 172 clubs operated 370 rearing ponds with a water area of 240 acres.

Sale of Bass, Prohibited in 1935
Sale of Quail, Prohibited here in 1881
Spearing, Declared unlawful in 1871 during March, April, May,
November and December
Spearing law of 1871 repealed in 1879 (Now unlawful to
possess a spear)
Spearing Permit, Clubs must hold at least 6 meetings a year

State Conservation Committee, Formed 1934
State Parks, (Paid attendance for 1936 was 907,734)
State Park, (Indiana's first - McCormick's Creek, purchased
1916)
State Parks, Indiana now has 12

Trees, Distributed by state nurseries for reforestation at
cost of production
Tularemia, (Not a new disease - recognized in California in
1906)
Turkeys, Wild - (First protection in Indiana 1857 - closed
season March 1 to September 1)
Trout, Were planted in Indiana over ten years ago

Uniforms, Indiana wardens should wear them as much as
possible

Violations, Each yearly record looks better (Indiana's club
system is working)

Wardens, Indiana's first force 1897
Wells, (Over 35,000 oil and gas wells have been drilled in
this state)
Wells, (Deepest in state - 3996 feet - Howard County near
Greentown)

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

Physical Features of Indiana.

From the north of Indiana to the pocket or toe, you have a change from northern glacial lake conditions to oxbow lakes and bayous, with cypress trees and mistletoe. In brief, within the latitude of the state you have many examples of the north, the corn belt and the true south, with all the variations that you would expect from these three different zones. In addition you have country that was heavily glaciated, thousands of years ago, and country that was untouched by the great glacial drifts. These facts give our state a wide range of animal and plant life, from the northern types to the southern.

Eighty-five per cent of Indiana drains into the Mississippi and fifteen per cent into the St. Lawrence.

Looking down on Indiana, you would find its highest ground in Randolph County, where the waters flow in three directions. But you would find hills in Steuben, Brown, Jackson and other counties nearly as high.

Looking down on Indiana, you would find concentrations of Glacial lakes in the north, gradually dwindling out until the last one is now found in Grant County. You would see streams, those to the north very young, only a few thousand years old perhaps, but you would note others to the south that, for many times more than that, have cut their courses through the hills to empty into the Ohio.

Through the middle of the state, from west to east, you would see the corn belt--a part of the only corn belt in the world--with its high state of cultivation, and with tight wire fences designed to keep swine safely within their fields. You would see corn farther south and farther north, but nowhere in the high relative amounts that you would find through the central district. You would see broad, level valleys along the branches of the White River and tributaries, where floods prevent close fencing but where corn grows abundantly.

Touching the state on the north you would see Lake Michigan, one of the greatest systems of lakes in the world. This series of lakes is almost arctic, and its fishes include the cold water type. Touching the state on the south you would find the Ohio, directly connected with the great south and containing many southern forms of life.

Lake Michigan.

After you get this general picture of the state in mind, consider Lake Michigan. It dents into the northwestern part of Indiana, and forms the north boundary line for Lake and Porter Counties and part of the north border for LaPorte County. Its drainage area in Lake, Porter and LaPorte Counties is very narrow, however, extending back about fifteen miles. But to the eastward, the Lake Michigan water shed extends over three counties and the St. Joseph River and its Indiana tributaries, Pigeon and Fawn

Rivers, reach almost to the Ohio state line, and account for the high hills of Steuben County, where the waters flow partly into Lake Erie and partly into Lake Michigan.

One of the outstanding features of the Lake Michigan drainage area is the dunes, a part of which have been preserved from encroachment by the Dunes State Park. The dunes are high sand hills, formed by the winds. In this region is a greater range of vegetation than in any other single area of Indiana. Some types of growth are like those of the Arctic region, and some are typically southern, so that the Dunes Park is a place of great interest to scientists and nature students.

Lake Michigan is a commercial fishing lake. A commercial fishing lake is one in which fishing for the market, or fishing as a business, is the most important part of such activities. So Lake Michigan should be, and it is becoming, a fish farm. The purpose of Lake Michigan, chiefly but not wholly, is to help to feed the people. Indiana includes 230 square miles of Lake Michigan, and the conservation interest there is in producing a more abundant crop of fish each year for purchase in the market.

The tributaries of Lake Michigan, however, such as the St. Joseph, have a chief purpose in their recreational or social interest. These streams drain many lakes, marshes and sandy hill lands and are always clear, and their life includes all the forms of the central part of the state and some of those of the north, of which trout and wild ducks are examples.

Northwestern Indiana.

This area was once covered by a great lake, possibly thousands of years ago. This fact accounts for the strange, level nature of the land, and the flat, wide valley of the Kankakee River. Over this area are low ridges of sand and gravel, and in some of the level plains are muck soils and sands.

The science of geology tells us that the St. Joseph River once flowed westward from the present location of South Bend, its water going down the Kankakee. A glacier blocked the way to Lake Michigan, so that the waters could not flow northward with the slope. This accounts for the wide valley of the Kankakee. When the ice melted to the north, the St. Joseph had scoured out its valley as far as South Bend, but it then turned directly northward and flowed to Lake Michigan. This made the divide between the St. Joseph and the Kankakee, which became an Indian portage. As it could be reached from the East only by going northward through Lake Huron and southward down Lake Michigan, it was not the important portage that nature constructed at Fort Wayne.

Much of northwestern Indiana, and all down the western border of Indiana, was once prairie. Trees such as cottonwood and river birch grew along the streams, but the rest of the land was in wild, native grasses, and there were great herds of buffalo and miriads of wildfowl in this area, and the waters teemed with fish. You will see the last of these prairie and marshlands along the Kankakee and in parts of LaPorte, Starke, Marshall and other counties.

There are two principal features of northwestern Indiana--the Lake Michigan drainage, already mentioned, and the Kankakee

valley, which drains westward into Illinois, into the Illinois River and thence to the Mississippi. Originally, this valley was flooded miles wide every spring and it teemed with wildfowl and contained deer, bears and otter, and the annual yield of furs of mixed kinds once amounted to immense wealth.

Wide expanses of the old Kankakee River were known as lakes. They were very shallow. There remain, however, some glacial lakes of size, including Bass Lake in Starke County, a wide, relatively shallow expanse, sitting on top of the indefinite divide between the Tippecanoe and Kankakee Rivers.

Northeastern Indiana.

Northeastern Indiana contains parts of two drainage areas, the Mississippi and St. Lawrence. The St. Lawrence drainage may be subdivided into two others, the Lake Michigan and the Lake Erie. Its western waters flow westward into Lake Michigan. The waters from a part of Steuben, from DeKalb and part of Allen counties and minor other areas, flow into Lake Erie. The remainder goes down the Wabash River and into the Mississippi.

The Lake Erie drainage area is one of the most interesting in the state. Science tells us that the glacier made one of its last stands in a spearhead point that reached into Indiana from Ohio. The northwestern edge of this spearpoint was along what is now the St. Joseph River of the Lake Erie system. This river reaches into Indiana from Ohio, entering the state in southeastern DeKalb county and flowing almost direct southeast until it reaches Fort Wayne, when it turns around and goes back in the direction from which it came.

The southwestern edge of the spearpoint is the St. Mary's River, which enters Indiana through Adams county, flowing through Decatur, and going almost direct northwest until it reaches Fort Wayne, when it meets the St. Joseph River and then turns around and goes back eastward into Ohio.

Where the St. Marys and St. Joseph Rivers meet at Fort Wayne, they are called the Maumee River, which goes into Ohio and Lake Erie.

But while the glacier was covering northeastern Indiana, and while its edges were where the St. Joseph and St. Marys Rivers are today, these two streams could not form the Maumee and flow back northeastward. The ice barred the way. So they flowed out into what now is Little River, which enters the Wabash west of Huntington.

Science tells us that the glacier often melted in such amount that it formed a torrent of water larger than the Niagara River. What happened can only be imagined. You can imagine that where warm winds struck the glacier they formed fogs, and that these fogs were turned to rain and snow; that when the sun shone, the ice melted in tremendous amounts, only to freeze again in winter; that the whole country about the edges of this glacier was an area of dampness and chill, with torrential rains and violent storms and brief periods of intense summer sun, when warm breezes, possibly from the southwest, melted the ice so rapidly that the Little River valley, two or three miles wide, was a raging torrent.

When the ice no longer barred the way, the St. Joseph, St. Mary's and Little River had already worn their channels and eroded their valleys. But the land sloped toward Lake Erie. As water runs down hill, the water from the two rivers ceased to flow into the Wabash but, instead, went northeastward. So we have the strange fact that the St. Mary's and St. Joseph rivers flow westwardly into Indiana from Ohio, and then meet and flow back in the direction from which they came. At few places in all the world will you find such a phenomenon of nature. This is the teaching of geology.

But something else happened when the waters changed their course. The broad, shallow Little River valley no longer received its deluge from the glacier. But the rains continued it as a river and in its marsh lands were many springs. Its current barely moved, and the Indians called it the Standing-Still-Water. It was deep enough for canoes from the north.

These canoes came from the Great Lakes, from the Eastern sea coast, from the North Woods, and thence up the Maumee River to Fort Wayne, and, by short portage, to Little River and thence down the Wabash, Ohio and Mississippi. This is geography.

As the Fort Wayne portage was an important point in the age of water transportation, its control was coveted by European nations. France and England fought for it, and at last the United States of America took and held it.

Thus geology makes geography and geography makes history-- which is an important point to remember when studying any feature of Indiana. Geology and geography also affect our recreations and our agriculture.

Northern Indiana Lakes.

When the glaciers came down into Indiana, they were not level on the bottom. They did not bring an equal amount of gravel all over the bottom of the ice. In other words, the bottom of the ice was uneven. When the ice melted, it left deep holes in the surface of the land. Some holes were large, some small. When the glacier was all melted, these holes remained as lakes. Through the ages, untold millions of plants and tiny animals have lived and died in these lakes, filling in the edges and filling up the bottoms. The material left by the plants and animals is muck and marl. Muck is decayed vegetation. Marl is the old skeletons of tiny animals such as daphnia. These skeletons were largely lime; so marl is nearly all lime. The lakes have been filling themselves up for millions of years, and geologists can make studies of any lake and find its old outline. The lakes naturally tend to destroy themselves.

Among the largest of our glacial lakes are Wawasee, James, Tippecanoe, Maxinkuckee and Bass Lake. Many lakes have been drained by the white man within the last human lifetime--that is, sixty years. In fact, the white man has done more to destroy our lakes than the forces of nature. He has done, in a lifetime, more damage to our lakes than the forces of nature would do in thousands of years.

The time has come when an acre of water is worth more to northern Indiana than an acre of the richest land. People have

begun to realize this and sentiment has changed from a demand for drainage of lakes to a demand for protecting and even extending them, and for maintaining the lake levels and underground water tables.

Central Indiana.

Before the glaciers, northern and central Indiana was hilly. When the glaciers came down into Indiana, they came from the far north. They leveled high mountains of the north, ground the mountain tops into big boulders, gravel, fine sand and clay, and brought these materials into Indiana. When the glaciers melted, these deposits of boulders, gravel, sand and clay filled the valleys and left a thick deposit over the whole central part of the state and down the western and eastern parts. The central part of the state is called the Tipton till plain. "Till" is a scientific name for earth left by a glacier. Plain means a general level area.

After the glacier was gone, snow and rain caused a run-off of water. This water naturally sought the low places.

The run-off of water gradually caused water courses to form. These varied from small creeks to mighty rivers like the Wabash. The streams gradually scoured out valleys. Gradually our river system was worked out over the Tipton till plain.

The Wabash valley is the largest in Indiana. It is also the most varied. It gets the overflow from hundreds of glacial lakes in northern Indiana, by way of the Tippecanoe River and other streams. It also drains large areas of the central part, by such streams as the Mississinewa. From such tributaries as the East Fork of White River and the Muscatatuck, it gets water from lands that never saw a glacier. It extends southward into the region of mistletoe and cypress. In brief, it begins in the southern part of the cold zone, flows through the corn belt or middle zone, and enters the Ohio River under typical southern conditions. It is a stream of romance, born of the glacial lakes and ending its course midst southern vegetation.

Southern Indiana.

Southern Indiana is interesting for its geological formations and for its plant and animal life. When the state was very young--possibly 50,000 years ago--the glacial ice covered large parts of it, extending southward on both sides of Morgan County and leaving glacial lakes which have disappeared. The nearly level bottoms of these lakes remain, however, and one of them is being restored in Martin County.

Part of southern Indiana is till plain. Part of it was not glaciated. Much of it is hilly, but parts belong to the low plains country.

Extending down the east side of the state is the White Water River, whose source is on the southern edge of Randolph County. Extending down the west side is the Wabash, a hilly country is found between these streams, extending northward to Morgan and Brown Counties. Many of these hills are sandstone. Where you find sandstone formations, you find the slopes of hills very steep.

Other hills are of limestone surface, such as Monroe County. Though the differences in elevation may be as great, the limestone hills usually have more gentle slopes than the sandstone.

Water does not affect sandstone so rapidly as it affects limestone. By chemical action and by the effect of acids collected from decaying leaves and from tree roots, the water wears into limestone. The water disappears into the stone. As ages pass, the limestone is eroded about the edges of the place where the water disappears. The result is underground streams and burst out in many places as "springs". Some of these underground streams have eroded great caves. Many creeks in the limestone country will flow for miles and then disappear into the earth. Along the larger rivers and some of the creeks, cliffs are worn, as along the White River.

In ages past, the tops of some of the caves, occupied by streams, fell in. Ages ago, McCormick's Creek flowed underground, and then the top fell in, and the result is the canyon that you see in McCormick's Creek State Park.

Lying to the westward of the hill country you find a low plain, worn down by the ages from higher levels by the rainfall.

An interesting phenomenon is found in Jefferson County. Chicken Run drains lands about Hanover, and its water shed extends to within a mile of the banks of the Ohio River. You would naturally think this stream would flow into the Ohio, but its waters travel hundreds of miles to reach that stream. Chicken Run flows into the Muscatatuck, to the north of Hanover; the Muscatatuck flows into the East Fork of White River in Jackson County; the East Fork joins the West Fork at a corner of Knox, Daviess and Pike Counties; the combined forks of White River flow into the Wabash at the south end of Knox County; and the Wabash flows to the very toe of the state before entering the Ohio. This is one of many pranks Nature has played in southern Indiana.

Indiana does not have mountains but it has a close approach to mountain scenery in many places. Roughly, the difference in elevations is 700 to 800 feet. In Randolph County the elevation above sea level is 1285 feet. Points in Steuben, Brown and other counties rise to 1,000 feet or more.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

LAND USE

Its Relation to Our Present and Future Game Supply

Most of you in your travels about the state and through other states have, no doubt, noticed differences in topography, climate, crops, vegetation, type of farming, quality and size of farm buildings and the general quality of farm land.

These differences are sometimes very striking as you travel from north to south or east to west. Indiana has some excellent farm land; it also has some land that is unsuited for farming. Between these two extremes considerable variation in the quality of land also is evident.

These differences in soils, climate, crops, vegetative cover, and kind of farming practiced also influence the kind and amount of game that is found in these areas.

In our Land Use Planning work in this state we are primarily interested in determining:

1. How the land should be used, or better still, what the land is best suited for.
2. How to bring about this shift or change in land use through education, legislation, and the use of public funds.

During the past five years considerable interest has been shown in proper land use, with particular emphasis being placed upon an action program of getting land into its proper use.

The Soil Conservation Program, and the activities of the State Conservation Department, National Forest Service, and Resettlement Administration are being directed along this line.

Now let us look back upon what has been the policy with respect to our game resources. Many of you have lived through the exploitation stage, where the sky was the limit, and a person's reputation as a hunter, fisherman, or trapper was based upon the amount of fish and game brought home. Fish and game were plentiful in those days.

Gradually, with the expansion of agriculture and this exploitation process, fish and game numbers were reduced. The natural conclusion was to reduce the days of open season and the daily limit. The hunter, fisherman, and the trapper re-

Land Use - 2

ceived most of the blame for reduced numbers-little attention or consideration was given to other very important factors such as clean cultivation, cutting timber, construction of drainage ditches, and the like.

In spite of these restrictions, fish and game continued to become more scarce. Then someone conceived the idea of artificial propagation and with it we have the growth of our fish hatcheries and game farms. Now our troubles would soon be over-at least that was the opinion of many-a very simple inexpensive process, this artificial propagation and liberation-in just a short time fish and game would be plentiful again.

But somehow or other our fish and game divisions were not the magicians they were thought to be. Thousands and thousands of dollars have been spent, much of which must be charged up to good intentions and experience. Don't misunderstand me- I am a firm believer in artificial propagation and it has a very important place in a well rounded and properly coordinated conservation program. Thousands of game birds and millions of fish have been liberated and planted in places where they had little chance of survival.

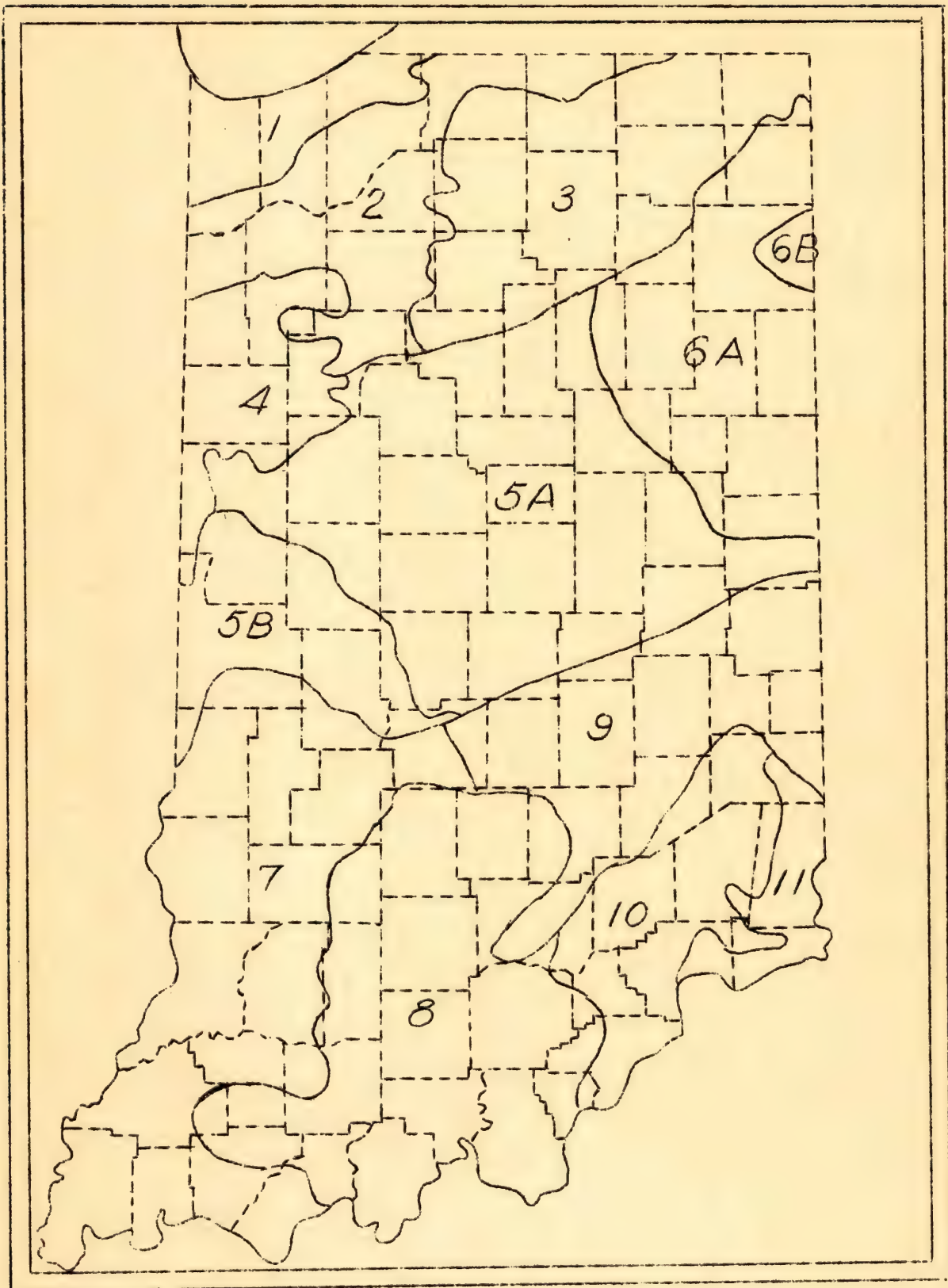
In spite of, or rather because of these unfortunate experiences much more progress is now being made with the development of a new field of work which is commonly called Game Management.

Game Management as a science is yet in its infancy, but rapid strides are being made. There is coming to be a realization more and more that only under certain conditions can our fish and game numbers be expected to increase. Today, the chief topics of discussion are feed, cover, vermin control, and the like.

The Game Management and Land Use Planning people have much in common today. In many instances, adjustments that should and are being made in land use will fit nicely into plans for game management. In a few instances, the reverse might be true.

Now to be more specific, let us discuss more in detail conditions as we find them in our state, noting particularly the relation of soils, climate, cover and type of farming to the kind of game found and what might be done to increase present game numbers.

Types of Farming Areas in Indiana



Land Use - 4

Area I

This is a small area lying between the shore of Lake Michigan and the low sand and muck region of the Kankakee River. About one-fifth of the land is in corn, one-fifth in oats or wheat, and about two-fifths in pasture and hay. This is the heaviest milk producing section of the state, with most of the fields closely pastured after crops are removed. Cover will always be scarce in this area and for this reason game will always be scarce. Winters are also severe and the ground is often covered with deep snow for several weeks or more. Quail should be placed on the doubtful list. Places in this area are probably suited to pheasants.

Area II

This area includes most of the light and dark sand and muck region of the western Kankakee basin. Much of this area has been surface drained in recent years and much of it is still undrained. The Jasper-Pulaski game farm is in this area.

Corn and native pasture are the principal crops with very little land in wheat or oats. In some places cover is plentiful and in others sparse. Game is rather spotted.

This is a potential good fish and game area. In time, there will probably be some developments along the Kankakee river that will restore, partially, the hunting, fishing and trapping conditions existing before the drainage ditches were put through. Feed and cover, while plentiful, can be much improved. All kinds of game thrive in this area.

Area III

This is the more important grass and pasture region in the state. About one-fifth of the land is in corn, two-fifths in hay or pasture, one-fifth in wheat or oats. Wet muck spots and swails are prevalent in this area. In all probability, this area is better adapted to pheasants than any other area in the state. Opportunities for improving cover and feed conditions in this area are practically unlimited.

Area IV

This area is principally black prairie soil, corn and oats being the principal crops. This is the highest priced land in the state. While feed is superabundant, cover is extremely scarce. Opportunities to improve cover in this area are decidedly limited. Every year, old hedge rows are being pulled out-the land is too valuable to waste it. Fence rows are usually kept very clean in order to protect against chinch bugs.

Land Use - 5

This is probably the poorest game area in the state-with little opportunity to do much about it. A few places, particularly along drainage ditches, might be suited to pheasants.

Area V

General livestock farming predominates in this area. Corn, wheat and oats are the principal crops. One of the common practices in this area is to cut and shock corn.

A variety of feed is found in this area, but cover is the limiting factor. There is some opportunity for improving cover, especially along streams, ravines, etc.

Area VB

Farming followed much the same as in Area V. Land is much more rolling and more waste land. Excellent opportunities exist for both cover and feed improvement.

Area VI A & B

This area resembles Area V in many respects but the cropping system contains more sod crops and less cover. Following the wheat the sod crop is likely to be left for more than one year as hay and pasture. The somewhat cooler growing season and character of the soil encourage the production of small grains and grasses.

It is in these areas that most of the Hungarian partridge are found and is about the only section of the state in which they thrive. The large hay acreage plus abundance of wheat and oats stubble combined with the particular type of soil seem to be favorable to the Hun. In parts of Area V, where soil conditions are the same, and where the same type of farming is followed, Huns are also found. Sections of this area are also well adapted to pheasants. Feed and cover are limiting factors with plenty of opportunity to improve both.

Area VII

The type of farming in this area is extremely variable in character, due to its being traversed by the Ohio, Wabash and White river valleys. Corn and wheat are the principal crops. Cover and feed is abundant in this area but there are numerous opportunities to improve both. All kinds of game thrive in this area, with pheasants limited to the low lands.

Area VIII

This is potentially the best game area in the state. Cover is superabundant with feed being the limiting factor. Opportunities exist for improving both cover and feed conditions. Lespedeza thrives in this area and can be easily established on the waste and abandoned lands.

Eventually, one to one and one-half million acres in this area will be in public ownership.

Area IX

This is the most important hog producing area in the state. Corn and wheat are the important grain crops. Feed is abundant in this area, the limiting factor being cover. On account of the competition with farming, opportunities for improving cover are none too favorable.

Area X

Most of the soil in this area is poorly drained, fine in texture, and lacking in plant food and lime. Much of the land in this area is of questionable agricultural value and would be better suited to forestry and recreation. Cover is plentiful in this area, but still there is excellent opportunity for improvement. Feed is also a limiting factor. This is potentially one of the best game areas of the state.

Area XI

This is an area of limestone hills. Alfalfa hay is one of the most important crops. Feed and cover, both of which can be improved, are limiting factors.

BY-LAWS

(Prepared and adopted by the State Conservation Committee in 1934)

Article I-Name

The name of this organization shall be the STATE CONSERVATION COMMITTEE OF INDIANA.

Article II-Object

The purpose of this Committee shall be to cooperate with the Department of Conservation of Indiana and in keeping a definite working program in operation between all the conservation clubs.

Article III-Classification

Section 1. DISTRICTS. - There shall be sixteen (16) conservation districts in the State of Indiana, which shall be divided as follows:

- 1st District - Lake and Porter Counties
- 2nd District - Newton, Jasper, Pulaski, Starke, Marshall, Fulton and Kosciusko Counties
- 3rd District - Benton, Tippecanoe, White, Cass and Carroll
- 4th District - LaPorte, St. Joseph and Elkhart Counties
- 5th District - LaGrange, Steuben, Noble, DeKalb, Whitley, Allen, Wells, and Adams Counties
- 6th District - Miami, Wabash, Huntington, Howard, Grant, Blackford, Jay, Clinton, and Tipton Counties
- 7th District - Vigo, Vermillion, Warren, Fountain, Parke, Putnam, Montgomery, Hendricks, and Boone Counties
- 8th District - Clay, Owen, Monroe, Morgan, and Johnson Counties
- 9th District - Knox, Sullivan, Greene, Daviess, Pike and Martin Counties
- 10th District - Posey, Vandenburgh, Warrick, Dubois, Gibson Counties
- 11th District - Spencer, Perry, Crawford, Harrison, and Floyd Counties
- 12th District - Lawrence, Orange, Washington, Jackson, Brown, Bartholomew, Scott, and Clark Counties
- 13th District - Jennings, Jefferson, Ripley, Dearborn, Ohio, and Switzerland Counties
- 14th District - Delaware, Henry, Rush, Shelby, Decatur, Fayette, Union, Wayne, Randolph, and Franklin Counties
- 15th District - Madison, Hancock, and Hamilton Counties
- 16th District - Marion County

Section 2. MEETING PLACE. - The meeting place for each of the sixteen (16) districts shall be as follows:

- 1st District - Gary - Gary Hotel Lobby
- 2nd District - Winamac - Court House
- 3rd District - Monticello - Court House
- 4th District - South Bend - Oliver Hotel Lobby
- 5th District - Fort Wayne - Keenan Hotel Lobby
- 6th District - Marion - Spencer Hotel Lobby
- 7th District - Crawfordsville - Crawford House Lobby
- 8th District - McCormick's Creek State Park, Spencer
- 9th District - Washington - City Hall
- 10th District - Boonville - Court House
- 11th District - English - Hotel
- 12th District - Brownstown - Court House
- 13th District - Versailles - Court House
- 14th District - Connersville - Fayette Bank & Trust Co.
- 15th District - Anderson - Hotel Anderson Lobby
- 16th District - Indianapolis - Antlers Hotel Lobby

Or at the next convenient location, as selected by the county representatives in that district, after they have assembled at the above locations at the designated hour.

Article IV-Organization

Section 1. - ELECTION OF CLUB DELEGATE. That on the 15th day of April, 1935, and annually thereafter, the Secretary of the State Conservation Committee shall notify all the active conservation clubs in the state of Indiana that they are to meet on a date convenient between the first day of May and the tenth day of May each year, and elect, from their membership, a Club Delegate and an alternate. Said Delegate to serve for a term of one (1) year and shall represent said club in the County Conservation Council. The alternate shall assume all duties upon the incapacitation of the Delegate.

Section 2. - ELECTION OF COUNTY REPRESENTATIVE. That on the 20th day of May, next following the election by each club of a Club Delegate, as provided in Section 1 thereof, said duly elected Club Delegates, from all clubs in the county, shall meet at eight (8) o'clock P. M. at the Court House in the County Seat of said county and organize a County Conservation Council. At this meeting the Council shall elect a County Representative and an alternate, who shall serve for a term of one year. Said Representative shall act as Chairman of the Council and shall represent said county in the District Conservation Council. The alternate shall assume all duties upon the incapacitation of the Representative.

Section 3. - ELECTION OF DISTRICT REPRESENTATIVE. That on the first (1) day of June at eight (8) o'clock P. M. next following the annual election of the County Representatives, all duly elected County Representatives in each District shall assemble at the meeting places provided for in their respective Districts and shall function as the District Conservation Council, in their District.

(A) On the first day of June at eight (8) P.M., 1935, each of the sixteen District Conservation Councils shall elect a District Representative and an alternate, to represent that district in the State Conservation Committee. Thereafter, on the 1st day of June at eight (8) o'clock P. M. on the odd numbered years the District Councils in the odd numbered districts shall elect a District Representative and an alternate and on the 1st day of June at eight (8) o'clock P. M., of the even numbered years the District Council in the even numbered Districts shall elect a District Representative and an alternate. Said alternate shall assume all duties and attend Committee meetings upon the incapacitation of the District Representative.

Section 4. - NOTICE OF ANNUAL ELECTION. It shall be the duty of the Secretary of the State Conservation Committee to notify those active conservation clubs in whose districts the term of their District Representative expires in order that an election may be held on the first day of June each year.

Section 5. - REVOCATION-VACANCIES. The office of District Representative may be revoked and declared vacant at any time, for good and sufficient reason, by a majority vote of the State Conservation Committee.

When any vacancy occurs in the State Conservation Committee or when a district has not been represented at three consecutive meetings it shall be the duty of the secretary of the State Conservation Committee to notify all the County Representatives in the district in which the vacancy occurs. The District Conservation Council shall meet and elect a successor as provided in Section 3, paragraph (A) hereof to fill the unexpired term of office of such District Representative that has become vacant.

Article V-Committee Meetings

Section 1. MEMBERSHIP. The membership of the State Conservation Committee shall consist of the sixteen (16) duly elected District Representatives, as provided in Article IV., Section 3, and the following honorary members:

President of the Indiana Division of the Izaak Walton League of America

President of the Indiana Fish, Game and Forestry Protective League

Member of American Legion Conservation Committee (To be named by the State Commander of the American Legion.)

Section 2. HONORARY MEMBERS. Each honorary member shall have the right to discuss and take part in any debate on any issue and he shall have the right to bring before the Conservation Committee any suggestions or questions of importance to the purpose for which this Committee is organized, but shall not have the right to vote on any issue.

Section 3. MEETINGS. The State Conservation Committee shall hold four regular meetings each year with the Conservation Department of Indiana, at such times and at such place as the president may designate. The president or any five members may call a special meeting of the Conservation Committee. Each member of the Conservation Committee shall be notified of the time and place of each regular or special meeting of the Committee.

Section 4. VOTING. Each duly elected District Representative or his duly elected alternate shall have one vote, but voting by proxy shall not be permitted. Ten duly elected District Representatives or their alternates shall constitute a quorum and may decide any question that may come before them.

Article VI-Election of Officers

Section 1. OFFICERS. The officers of the State Conservation Committee shall consist of a president and secretary-treasurer.

Section 2. ELECTION AND TERM. The officers of the State Conservation Committee shall be elected at the first meeting of the Committee after the annual election of District Representatives and shall hold office for one year or until their successors shall have been elected and qualified.

Section 3. VACANCIES. Any office may be declared vacant for good and sufficient reason by a majority vote. Sickness, continued absence or failure to function shall be considered good and sufficient reasons for declaring a vacancy, and the Committee shall immediately fill such vacancy by election.

Article VII-Duties of Officers

Section 1. PRESIDENT. The president shall act as chairman of all meetings of the State Conservation Committee. He shall appoint all committees and shall act as ex-officio member of each committee. He shall, with the secretary-treasurer, and with the consent of the committee, sign all notes, contracts or other instruments as may pertain to the business of the committee and shall perform such other duties incident to the office of president.

Section 2. SECRETARY-TREASURER. The Secretary-Treasurer shall keep a permanent record of the minutes of each meeting of the State Conservation Committee. He shall serve all notices as provided for in these by-laws. He shall have the custody and be responsible for the safe keeping of all funds, monies, and papers of this Committee. The Secretary-Treasurer shall, in the absence or incapacity of the President, act as chairman of the meetings and shall assume all the duties of that office until a President has been duly elected or the incapacity removed. It shall be the duty of the Secretary-Treasurer, upon the inability of the President or himself to attend the meetings of the Committee, to appoint a temporary chairman to assume the duties of the office of President.

Article VIII-Amendment

These by-laws may be amended, altered, or added to at any time by resolution of the State Conservation Committee, such resolution for amendment, alteration or addition to be filed with the President at any regular meeting and thereafter be approved by a vote of the members at the next succeeding meeting of the club as provided in Article V.

Approved) WILLIAM F. COLLINS
) IVAR HENNINGS
) WALTER E. JOLLY
 By-Laws Committee

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

EDUCATIONAL BUREAU

The Educational Bureau is the youngest of the divisions of the Conservation Department. It was organized in 1934 for the general purpose of putting conservation before the public. Prior to the time of its organization, there was no coordinated effort to advertise Indiana's attractions or to stimulate interest in the need for a statewide conservation program. Each division carried on its own educational program, and as a result there was an overlapping of activities with general ineffectiveness.

At first, the bureau was composed of a Director and three representatives in the field. The field men were supplied with motion picture apparatus and their work was mostly that of club organization. Since then the demand for this activity has increased so much that five men in addition to the director are needed.

NATURE OF SERVICE

Motion picture films for six half hour shows are now available and it is also possible to obtain special lectures on topics relative to the conservation of our natural resources. Each man is responsible for the activities of the conservation organizations in his zone. Much of the field men's time is spent in contacting club officers and other prominent people in an effort to increase the interest in conservation affairs. Many times the warden is able to make this work more effective by sponsoring meetings with other types of organizations, such as Service Clubs, PTA's, Schools and student organizations, religious and sectarian groups, fraternal orders, women's clubs, civic organizations, and nature study groups.

CLUB ORGANIZATION

The backbone of the educational program in Indiana is the statewide organization of conservation clubs. They furnish the department with much valuable information, do a great amount of worthwhile conservation work themselves, and act as disseminators of information in their own communities. There are 664 of these clubs in the state today, with a total membership of over 165,000 people. A copy of the by-laws of the State Conservation Committee is attached to this report, and the warden will find it worth his while to read it. Roughly these bylaws provide for a system of representation for every club in the state. Each club elects a delegate, who with the delegates from other clubs in the county, constitutes the County Conservation Council. This council elects its own officers, including a County Representative, President, Secretary, and acts as a coordinating body for the various clubs. On alternate years district representatives are elected by the county representatives who gather at specified places and times for this purpose. The district representatives make up the state conservation committee. The committee acts in an advisory capacity to the Conservation Department, and meetings with the committee are held quarterly, at which outstanding problems are attacked. A member of the state committee is a delegate to the annual con-

ference of the American Wildlife Conference.

CLUB ACTIVITIES

In fostering the conservation club idea the department has sponsored and encouraged a number of activities which have been very effective in maintaining interest and life in the various clubs. The major activities will be treated in full in other reports but can be mentioned here as vital parts of the club program. Of first importance are regular meetings. Wardens should insist that wherever possible meetings be held at least once a month with a variety in program material. Speakers from the locality in which the clubs operate should be used often for they create much interest. The educational bureau will furnish speakers for these meetings upon request giving two weeks notice.

The distribution of game and fish will be a major activity of the club in many cases. Club members are familiar with best food and cover conditions and should be consulted before plans for restocking are made. Many clubs have well developed rearing operations. The rearing of pheasants, quail, raccoon, and fish will promote much interest, as well as provide a source of monetary revenue. Occasionally clubs sponsor drives on various predatory or obnoxious animals. These vermin contests, crow hunts, etc., are especially effective with younger club members, and often can be used with Junior groups. Game food and cover improvement projects call for a lot of work, but are extremely worthy. Campaigns for the use of flushing bars might come under this heading. Those clubs which are interested in fish and fishing, as well as many other groups will be especially active in stream improvement work, which would include the agitation necessary for pollution control, building of low log dams, and planting of streamside forests, as well as posting of spawning grounds. During the winter months there is no more important activity than winter feeding of wildlife. The warden should encourage the clubs to work out a definite plan for this activity. Rifle and pistol matches, trap and skeet shooting, are good ways in which to interest club members.

AN AID TO WARDENS

In many small communities the opportunities for social affairs are limited. In such places conservation clubs can serve a valuable function. All in all the educational aspects of the conservation clubs are the most important. This fact becomes apparent when we consider the increased interest in the activities and properties of the department, the decrease in fish and game law violations, and the conservation-mindedness of the general public. Without a doubt this change in attitude has been a decided help to the warden in every county in the state.

NATURE GUIDE SERVICE

The Nature Guide Service which is directed by the Educational Bureau, was maintained in five state parks last summer. A total of 21,247 persons were contacted from June 11 until Sept. 2; 304 bird hikes and 1,248 general nature hikes were conducted and 168 lectures were given on conservation topics. This year guides will be stationed in the Dunes, Turkey Run, McCormick's Creek, Brown County, and Clifty Falls State Parks.

RADIO BROADCASTS

Radio talks are given regularly over station WFBM, Indianapolis, every Friday noon, by a member of the department. Arrangements are being made for weekly news announcements to be broadcast from station WOWO, Fort Wayne.

OUTDOOR INDIANA

Outdoor Indiana, the monthly publication of the department, which was started in February, 1934, now has a circulation of over 130,000. It is mailed without cost to members of conservation clubs, and to any others interested in the welfare of the out-of-doors. The magazine is the most effective feature within the scope of this division and is a great medium for bringing the pressing need for conservation work into the remotest corners of Indiana.

WILDLIFE EXHIBITS

In addition to the activities which have been outlined before, the Educational Bureau furnishes exhibits and displays to many special meetings. The large display trailer was scheduled through the summer and up until late fall at county fairs, outdoor shows, etc. In fact the demands on this exhibit were so great that two special displays of animals and birds was on the road most of last fair season. Even with this addition it was often impossible to fill all the requests for this feature. Wardens should encourage clubs to apply for the displays as early as possible.

A battery of aquariums for special displays of fish has been put in order, and was used on numerous occasions last summer. Species of game fish as well as other common and unusual species of fish were included in this exhibit.

WINDOW DISPLAYS

Fifty picture display boards which were sent to the wardens two years ago are still in use. New pictures are being made at the present time to take the place of the old ones which are becoming badly worn. The location of these display boards should be changed at regular intervals so that as many people as possible may have the chance to see them.

In brief then, these are the activities of the Educational Bureau, Club work, Outdoor Indiana, Radio Talks, Nature Guide Service, and Special Displays. During the fiscal year of 1935-36, the staff attended 911 meetings and contacted directly, more than 147,883 people; 124 school meetings were attended at which 25,294 students were given much valuable and interesting conservation education. The number of people contacted through special displays would undoubtedly run over 300,000.

NEED FOR ADDITIONAL WORK

It was stated at the beginning of this report that the general purpose of the bureau was to put the activities of the Department of Conservation before the public. How successful the bureau has been may be judged by the figures given. The educational program, carried on by the field men, and the wardens, with the cooperation of conservation clubs has resulted in an increase in the attendance at state parks, a decrease in the game and fish

law violations, a greater respect for the out-of-doors, an increase in the sale of hunting and fishing licenses, and the enactment of much needed conservation laws. The beneficial effect for the present generation is almost beyond intelligent estimate. The effect in the future no one can imagine. By education of young and old today the way is being paved for those who must manage the natural resources in the future.

Extensive as the work has been, the field has just been scratched. There are almost 370,000 people in this state who buy hunting and fishing licenses. There are only 165,000 people enrolled in clubs as active conservationists. There are three million people in this state, and only a small percentage of them have visited the state parks. The need for education along these lines in the schools is recognized but as yet there is no school in Indiana which can boast of a course in conservation. The way is clear and still much is to be done. Wardens and field men are better equipped. They know how to approach and solve problems which were a mystery a few years ago. There are many friends who are ready and willing to help and the next few years should result in great advances in the field of conservation education.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

PUBLICITY -- OUTDOOR INDIANA

One of the chief activities of the Department of Conservation during the past four years - and one that is increasingly important - is the development of an educational program seeking to inform the people of Indiana of the activities, purposes and services of the Department.

This program has been developed along three major avenues - furnishing speakers and motion pictures for club meetings, furnishing articles for publication in the newspapers, and issuing a monthly magazine, Outdoor Indiana. It is the first time that any such definite program to acquaint the people of the state with the purposes and operations of the department has been undertaken. This program met with immediate approval when it was inaugurated and is continually growing in effectiveness.

Through the publicity given department activities there has been a steady increase in attendance at the state parks, increased sale of hunting and fishing licenses, increased observance of the fish and game laws, greater participation in reforestation and fire prevention programs, and a better understanding of the value of natural resources.

This program has not reached its final stages - it is not perfect - but it has been developed slowly and carefully as a means of guarding against the dangers that such programs often encounter. Publicity in any form is a two-edged tool - it can be destructive as well as constructive. The wrong form of publicity, whether it be a statement by a speaker, an article in a newspaper or an action of the Department can do more harm to Indiana's conservation program than a score of beneficial things.

In the development of the Department's publicity the entire program has been designed to acquaint the people of Indiana with the natural resources which their state possesses, with the steps necessary to safeguard these resources and with the Department's services. Only secondary consideration has been given appeals to the residents of other states.

The first task is to inform Indiana residents and this attitude will continue. The more that they know and appreciate their state and the work of the Department, the nearer Indiana will be to realization of the conservation goal. The residents are the ones directly affected and the ones who will benefit the most from the increased understanding.

At the same time the potential tourist throng is being attracted to Indiana in increasing numbers through the publicity program and their realization that this state offers splendid vacation and recreational opportunities. The lakes and streams are a major asset in attracting tourists. The state highway system providing easy motoring from the lakes and streams to the parks and forests and other places of interest, is another.

There is no limit to the attraction which Indiana can have for the tourist as well as for residents of the state. It will not benefit the conservation program to claim the best fishing unless such claims are true. It will not help to boast about the hunting unless the game is present and nothing is to be gained by overstating such features.

You are familiar with the first of the three publicity methods which makes up the department's program - the furnishing of speakers and pictures for meetings of clubs, schools and other interested groups. The scheduling of speakers has won support and the activities of the clubs themselves, provide a source of publicity which has been invaluable but this can be developed still more as a basis of articles for local newspapers.

The second of the publicity methods is one in which the warden can be of great assistance, providing they approach it with the proper attitude. The department is dependent to a large extent upon the cooperation of the newspapers in dispensing information about its activities and for support of its programs.

During the past four years the cooperation given the department by the newspapers has been exceptional. They have given thousands of columns of space to articles on conservation activities and to pictures from the parks and other conservation properties. In addition to the use of material supplied by the department, they have originated their own articles and pictures. In addition to the news articles, many papers have carried editorials endorsing the program.

Too frequently newspapers are regarded with the suspicion that anything said in the hearing of a newspaper reporter will be printed in a form that it will discredit the speaker or the department. When such things happen, it is usually the fault of the speaker. It is important when talking to a newspaper reporter on a subject about which he is to write, to be sure that your facts are correct and that you make them clear.

Fewer mistakes will occur if you remember that the reporter is not as familiar with the topic as you may be and that he must be given a clear picture of the subject before he can reproduce your story. In other words, regard the newspaper as a mirror. If you, in talking to a reporter, make a foolish statement or one that is inaccurate, do not blame him - the responsibility is yours.

Another frequent mistake in dealing with newspapers, is a tendency to "raise Cain" over some triviality. This may lead to antagonism not only toward yourself but to the department. When a mistake has been made and you are sure that it was not your own, consider whether it is of sufficient importance to fuss about it before you talk to anyone. If it is important, visit the newspaper office and explain the mistake. Approach the editor or the reporter in a friendly manner, you will be met in the same way. Remember that the newspaper can do more for or against you and the department in that community than any other one agency.

This does not mean that you adopt a subservient attitude but merely apply the golden rule of treating the newspaper as you expect to be treated.

When there is more than one newspaper in the same town, see that they are treated alike. Do not play favorites although one paper may show a greater appreciation of the conservation program than the other. This does not mean that when a reporter from one paper asks for information, you should see that the other paper or papers have the same information. But when you are giving out information, not being asked for it, see that it reaches each paper.

Each week the Department sends news articles to nearly four hundred Indiana newspapers. These are prepared in mimeograph form, dated for the time they are to be used and mailed to reach the newspaper on Monday whether they are for use on that or a subsequent day. These stories are not used every week by every paper but there is hardly a paper in the state which does not carry one or more articles on conservation once or more each week.

In addition special articles are prepared upon request, photographs are furnished and notices of meetings to be addressed by members of the educational division are sent to the local papers with a picture of the speaker. Other stories are given to the Associated Press, the United Press and the International News Service which serve most of the daily papers of the state. One example of this publicity is the weekly report on fishing conditions compiled from the information sent in by the wardens.

You can aid in the preparation of departmental publicity for the newspapers by sending in information which is of general interest or has sufficient value to the department to justify its use. Time is an important element in the handling of material for the newspapers. It is news today and history tomorrow.

If you have some information that would make a good news article, mail it in immediately. Be sure that it is clearly written, that you give all the facts and that any names used are written so that there will be no mistake in spelling.

In your contacts with the newspapers through the district you may pick up suggestions which will be of value in the handling of publicity. Possibly they are interested in a story on some particular activity of the department, in an article on one of the state parks, forests, game farms or hatcheries. Possibly they would like to have photographs of scenes in the parks or other properties for use in their paper. This information will be valuable and appreciated. On the other hand there may be some criticism, justified or unjustified, which should be reported in order that an explanation can be made by the proper division of the department.

The part which you can play in cooperating in the publication of Outdoor Indiana is just as important but of a slightly different nature. First the magazine is an expression of the department, carrying information to its readers and seeking to interest them to a greater degree in various conservation activities. Second it encourages the activities of the clubs and of individuals by the articles and pictures published of club activities and of individual accomplishments.

Since February, 1934, when the magazine was first issued, it has had splendid cooperation from some of the representatives of the department and little or no cooperation from others. Some representatives have sent in information on activities in their districts, including photographs and other data which could and has been used in the magazine. It is only rarely that such contributions have not been used and in those cases the failure was due to general policies governing material published.

One of these policies with which you should be acquainted, is that the magazine as well as other publicity of the department, is designed to advance the conservation program and not any one individual. Another is that only in exceptional cases can references to a representative of the department be made or his picture used in the magazine.

A general fault in the sending in of material and pictures for the magazine, is failure to give complete facts or to write so there is no question about the spelling of names. A picture in which several persons are shown, has no value unless the names of all of them are given so that they can be identified. This identification should include the position of each person, starting at the left side as you look at the picture.

Be sure that any material you send in for the magazine or suggest that others send in, tells the complete story and that pictures are fully described. Do not hesitate to send in items when you have a question as to whether or not it is suitable. The editorial staff of the magazine will be glad to have it and to use it if it is at all possible.

Frequently there may be some delay in the publication of a picture or a story. It is not always possible to use all of the contributed material the month in which it is received and some must be held. At other times the material which you send may not reach the editors in time for use in the next issue.

All material for a specific issue of the magazine should be in the hands of the editors not later than the first of the month preceding that of publication. For example: you have a story which should appear in the August issue. The material for this issue must be in the hands of the editor not later than the first of July to be used. It is impossible to guarantee that an article or picture will appear in any designated issue but when requested, every effort will be made to fulfill it.

Another problem that arises frequently in the publication of the magazine is the request that photographs be returned. In the making of plates from which the magazine is printed, it is often impossible to prevent the marking or otherwise damaging of original photographs. In obtaining pictures to be sent in for Outdoor Indiana, be sure that the person from whom you are obtaining the picture understands this. Photographic negatives are another source of trouble, as prints must be made from these and there is always the possibility that the negative be damaged or lost before it can be returned.

It will be much easier and cause less confusion if only glossy print pictures are sent in which do not have to be returned.

In the past there may have been some disappointments regarding material sent in for use in the magazine not appearing in the next issue. Sometimes this has resulted from failure to send the material to the editor of Outdoor Indiana. All material for use in the magazine or letters about the magazine, should be addressed to the editor.

There may be some question as to the type of pictures and material which is acceptable for publication: We are interested in pictures related to any part of the conservation program whether it is fishing, beekeeping or activities of the clubs and their members. We are interested in material related to any part of the conservation program, when the material is of general value or interest to the state at large.

Through your contacts with the people who are engaged in conservation activities, you have a fertile field for both pictures and material suitable for Outdoor Indiana. When you encounter a

fisherman with a prize catch, suggest that Outdoor Indiana would be interested in having a picture of him and his catch. When a club has some special activity, suggest that a picture and information about that activity would be interesting to the readers of Outdoor Indiana. These are but a few of the subjects for pictures and stories which can be used - and which you have the greatest opportunity to secure.

The magazine is just as much an activity of the Department as the particular job to which you have been assigned and should be considered as such. Your interest in suggesting material for the magazine will be appreciated by the persons you contact and will result in their increased interest not only in the magazine but in the entire program.

Publicity - whether it is in the form of a talk, a newspaper article or a picture in Outdoor Indiana - is important to the work of the Department and to the future of conservation in Indiana. You as a representative of the department, are a part of its publicity and should make every effort to see that it is favorable and constructive.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

DIVISION OF GEOLOGY

I. Funds for Operation of Division.

The Division of Geology is operated with funds obtained from two general sources. The most important is the apportionment of the conservation appropriation from the general administrative fund. This money is supplemented by miscellaneous revenue from fees and sale of publications. The Statutes provide that a fee of ten dollars must be paid to the Department when each abandoned oil or gas well within the State is plugged. Of this fee, eight dollars is returned to the deputy gas inspector in charge of the plugging, to defray his expenses, and the remainder is put into the rotary fund. The sale of publications, maps and well records also adds to the funds available.

II. Administration and Personnel.

The director of the Division of Geology is known as the State Geologist, and by law is required to be a member of the faculty of Indiana University. He is also a member of the permanent State Planning Board. The office of State Geologist was first established by an act of the State Legislature in 1837, for a period of two years. Dr. David Dale Owen of New Harmony first held this position. From this time until 1869 there were several surveys of short duration. From 1869 to 1919, there was a continuous survey in the state, and in 1919 this survey was made a division of the Department of Conservation. Since this last date, the Department of Geology at Indiana University has cooperated with the State Division of Geology.

The State Geologist's office is maintained in the State Library Building with the other administrative offices of the Department which is also the office of the State Gas Supervisor. The position of State Gas Supervisor was first created when gas was being wasted in the famous gas field of northeastern Indiana. Since this time, the State Gas Supervisor has been placed in charge of all oil and gas drilling and production, and the enforcement of the laws pertaining to this. The remainder of the personnel consists of various assistants as they are needed to carry on the work.

The members of the faculty in the Department of Geology at Indiana University are also members of the State Geological Survey, and cooperate in every way with the State Division of Geology. The Division also maintains a laboratory with two assistants at Indiana University, for the study of minerals and samples of rock taken from oil and gas wells as they are being drilled. These assistants aid in the preparation of maps and charts concerned with the natural resources of Indiana.

III. State Museum.

The Division of Geology maintains and operates the state museum in the lower floor of the State House, for the preservation of items of historical and scientific interest. The articles exhibited have been donated by many individuals and are displayed

for public education. Included are many types of native rocks and minerals for those interested in geology, mounted specimens of many birds and animals for nature-lovers, antiques of many kinds and displays furnished by the various divisions of the Department of Conservation. Here you will find a splendid display of Indian and Mound-builder relics, a fine collection of old fire-arms, and weapons from different ages. The Division maintains a curator in the museum which is open daily except Sundays and holidays, to conduct tours and have charge of the exhibits and the labeling and cataloguing of the specimens on display.

IV. Service.

This Division furnishes information upon subjects which deal with geology and its related sciences, especially as they pertain to the conservation and best utilization of natural resources. Information is furnished without cost to many persons every year. The Division also cooperates with the other divisions of the Department and with other administrative branches of the Federal and State government, in work where geology is required.

Information concerning geology, archeology and topography is given to many organizations, such as the Boy Scouts, science clubs and schools. Service is rendered to investors and potential investors in the mineral industries, regarding the advisability of financing mineral exploration particularly for oil and gas. Exploration costs are thus kept down; and information dispensed in this manner has been responsible for discouragement of many schemes to develop coal in sections of the state where coal does not exist. The file of well records taken throughout the state has been instrumental in lowering the cost of exploration for oil and gas.

V. Investigations on Occurrence and Distribution of Mineral Resources.

The Division is continuously carrying on investigations with regard to the occurrence and distribution of the mineral resources within the State. This is done in part with the cooperation of the many industries in Indiana who are utilizing the state's natural mineral substances. Data on the occurrence and character of coal is obtained from well records and from bores drilled by coal operators. Some of the coal deposits of the state have been mapped by the summer Survey, consisting of the State Geologist and a party of geology students from Indiana University. Through its supervision of the oil and gas industry, the Division is enabled to obtain information upon the occurrence of these two important resources, and thus may make a scientific study of the oil and gas regions. Information on ground water is obtained from well records and other information gathered from water well drillers, and these data are used in the study of ground water conditions in the state. Statistics are also collected and studied, pertaining to other mineral resources, such as sand and gravel, clays, marls and stone. The Division is called upon to locate materials for crushed stone to be used as road materials; rock suitable for the manufacture of cement and lime; stone which may be melted and blown into rock wool, a rather new insulating material; and stone suitable to be quarried

for building purposes. These mineral industries provide an income for a great many people in this state, and the division is always eager to cooperate in every way possible for the better utilization of the remaining natural resources.

VI. Prepares and Distributes Data on Findings Concerning Mineral Resources.

After data have been collected from studies and investigations, the Division prepares and distributes findings on the occurrence and distribution of the mineral resources of the state and this information is made available to the public in the form of maps, books, pamphlets and papers. Maps are prepared to show the locations of oil and gas wells in various fields, the locations of pipelines for the transportation of oil and favorable collecting structures in the various oil fields. Studies are made of records and samples from oil and gas wells, in order to determine the geological conditions in these areas. Maps showing the geology of the state are available to all persons, as are plat books of each county.

Books and pamphlets are published from time to time on subjects dealing with the occurrence and conservation of all natural mineral resources. Besides these recent papers, the Division has available copies of the annual reports of the Department of Geology and Natural Resources from 1869 to 1919. These reports cover not only geological subjects but include also reports on zoology, botany, and archeology. Members of the Division also publish the results of some of their investigations in magazines and publications of scientific societies.

Records of the rocks passed through in the drilling of oil and gas wells are collected by the Division of Geology from the oil and gas operators in the State. These are made available at a nominal charge to anyone interested in the drillings and there wells logs are invaluable in the study of the rocks below the surface of the ground.

VII. Enforcement of Laws Pertaining to Production and Conservation of Oil and Gas.

The Division of Geology, through the State Gas Supervisor and ten deputies located in the oil- and gas-producing areas of the State, regulates the oil and gas industry through the enforcement of laws pertaining to the conservation of these important resources. The law requires that operators send a notice of intention to drill to the Division before wells are started. In this way a record is kept of the wells in the State, and from information obtained during the drilling the "Oil and Gas News" is printed every month. This is distributed to many oil operators in Indiana and other states.

The Division of Geology enforces the laws pertaining to the waste of petroleum and natural gas by inspecting equipment on wells and pipe lines. Faulty equipment is spotted and owners are notified to replace or repair this equipment. Any well that is abandoned, either a former oil or gas well or a dry hole, must be plugged in the presence and under the supervision of the State Gas Supervisor or his authorized deputy. This assures the protection of the oil- and gas-producing sands in the various pools. In addition to these duties, the oil and gas supervisors

enforce other regulations designed to conserve these resources, such as casing off salt water, so as to prevent drowning of the producing sand, and to prevent salt water from contaminating fresh water sands.

Within thirty days after the completion of any oil, gas, or test well, the operator must turn into the Division an accurate record of the formations passed through. These logs are studied for the purpose of determining the conditions in the field, and predicting future conditions in the area.

VIII. Water Supply - Public and Private.

The members of this Division are often enlisted to aid in the location of adequate and suitable public or private water supplies. In many cases, city officials ask for help to locate a water supply for municipal consumption. The location of such a source requires a knowledge of the geology of the region, and the character of the rocks with which the water will come in contact. Cities have often made serious mistakes in the location of impounding dams for their water supply, and have been faced by a serious shortage of water when it was most needed. In all such cases the Division recommends or condemns proposed locations, according to the findings.

In many cases, private industries or individuals contact the Division for information as to the location of a source of water adequate and suitable for their needs. Well drillers often consult records in the office, so as to know more about an unfamiliar region where they are to work. There is also close cooperation between this Division and the various other State and Federal agencies in regard to the location of water wells.

The Division is at present cooperating with the Ground Water Division of the U.S.G.S. in the study of the lowering ground water levels of the state, which has been occasioned by the droughts of recent years. The work has been started by the location of observation wells in nearly all the State properties and on some private property. The well is checked twice each month, through the cooperation of the C.C.C. and Soil Conservation Service camps. The level of the water in each observation well is measured and a record is sent to the United States Geological Survey, where permanent records are being kept. In time, these figures will be the basis of study of the water situation throughout the entire state, which may suggest a procedure to prevent future water shortages.

IX. Water Conservation.

The Division is vitally interested in the conservation of surface water, and aids in the construction of lakes, reservoirs, and fish hatcheries. These small bodies of surface water are a permanent benefit to wildlife in general, and aid in keeping the ground water level nearer the surface. This Division helps to supervise the construction of fish-rearing ponds, both for the Fish and Game Division and for conservation clubs over the state.

One of the important steps in projects of this nature is the geological study of the foundation upon which the water areas are to be constructed. After other agencies have made a tentative

selection of the site for a pond, this Division studies the area. If the rocks and surface materials will retain the water which is to be impounded, the site is approved. If, however, the foundation of the water area is such that water can not be impounded successfully, the location is rejected and a new one sought. When a suitable location for construction is found, the geologist supervises the selection of materials to be used in the construction of the earth-fill dam. Such material must contain a certain amount of sand or material other than clay, and the selection of a good borrow pit often constitutes quite a problem.

During the past few years, much of this work has been done in cooperation with the other divisions of the Department, and will be continued as long as possible.

X. Investigation of Best Uses for Raw Materials.

In several instances, State Penal institutions have found it necessary to start some new manufacturing project to employ their inmates. The Division has supervised the selection of such projects, and has located mineral resources which may be utilized in this manner. Clay deposits have been investigated and mapped before recommendation for use as raw materials in the manufacture of brick and similar products.

Often samples of soil, shale, clay or similar earth materials are received from individuals, with a request that the Division determine the practicability of utilizing these materials for specific purposes. In such cases it is up to the Division to determine the best use that could be made of the raw materials, according to occurrence, availability, and approximate composition.

XI. Mine Sealing and Stream Pollution.

In the past few years, the Division has been cooperating with the State Board of Health in remedying the contamination of streams by acid waters from abandoned drift and strip mines. The water from these mines often contains a high percentage of iron and acids, and as a consequence is extremely harmful to fish in the streams which receive this drainage. The most contaminated stream in Indiana before mine sealing began was the Patoka River, where, at various times, thousands of dead fish have been found. Several other smaller streams were seriously polluted with the acid mine waters.

The open pit or strip mines which have been abandoned are sealed by means of reinforced earth dams with spillways. These do not prevent the water from draining from the pits, but as long as the water level is kept high enough to cover the coal so that it does not come in contact with the air, no acid is formed, and the water which runs from the pits into the streams is comparatively free from contamination. The same principle is used in the sealing of abandoned drift mines. Here an obstruction is placed across the mouth of the mine to raise the water level within until the coal seam is covered. In some cases the mouth of the mine is sealed completely. The Division of Geology has charge of work of this nature, and is attempting to eradicate all such pollution.

In many cases, the oil fields of the state have contributed a share of the foreign, harmful material that is carried into the

streams.

The Division also traces this material to the source, and has been fairly successful in clearing up this type of pollution. The oil that can not be marketed, along with the salt water that is pumped from the wells, is run into pits under the present system, where the salt water is allowed to sink into the ground after the waste oil has been burned from the top of it. Such disposal of waste products protects not only the life in the streams, but the soil and vegetation of the fields as well. Before conditions in the oil fields were improved, it was a common sight to see ditches containing a scum of black oil over an inch thick, waiting for a heavy rain to take it down stream. Fish in the rivers tasted suspiciously similar to kerosene, since they seemed to absorb even the slightest trace of oil floating on the water.

The health problems resulting from the above pollution sources have not been mentioned because this phase of conservation is now being handled by the Department of Commerce and Industries in Indiana.

XII. Mapping.

The Division is interested in topographic mapping throughout the State. The summer surveys of former years have had mapping projects under the supervision of the State Geologist, mapping not only of the surface features, but also of the rock formations. Topographic and geologic maps are of immeasurable value, not only to the geologist, but to many State and Federal agencies as well.

Although very little of the area of Indiana has been mapped in this manner, the Division works with the U.S.G.S. in this type of mapping. The expenses of mapping are shared on a half-and-half basis by the State and Federal governments, and the Federal Survey does all the work. However, the State Division of Geology has the authority to select the areas that are to be mapped. In this way, the regions that are most needed will be completed first.

XIII. Miscellaneous Services.

Every year hundreds of specimens are brought to the office of the Division of Geology for identification. Many of these are rocks and minerals picked up by individuals. Some of them have some value but the most of them are cases of mistaken identity. This is especially true of yellow minerals thought to be gold. If gold were as plentiful in our State as some people believe, this would far outrank all states in value of mineral production.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

DIVISION OF STATE PARKS AND LANDS AND WATERS.

The chief function of this division is to conserve for all time to the people of Indiana certain areas of typical Hoosier scenery in its virgin state. Such areas of outstanding beauty, unusual formations, historical settings and places closely related to early Indiana development were thought worthy of preservation. In addition to this, it had long been known that a state, as a unit of government, had a definite obligation to its citizens. It should protect and preserve such areas, and in so doing provide access to them, provide means for their fullest and most complete enjoyment by the people, and also provide, without detracting from their natural appeal, such outdoor recreations and facilities as were compatible with the surroundings.

In order to perform these duties the State adopted the following regulations and rules under which the Division of State Parks and Lands and Waters operates:

The state parks are under the jurisdiction of the Department of Public Works and are administered by the Department of Conservation. (Law 1919, 1933).

Powers and Duties.

The Department is empowered to investigate, compile and disseminate information and make recommendations concerning the natural resources of the State and their conservation; including the drainage and reclamation of lands; flood prevention, development of water power; culture and preservation of forests; fish and game; the preservation of soils; the prevention of waste of mineral resources; the prevention and methods of control of plant diseases; infections and pests, and such other questions or subjects as may be contemplated by the Acts; may cooperate with departments of the Federal government in conducting topographical and other surveys, experiments or work of joint interest; may cooperate with any public or private institution or with individuals societies or associations of individuals in making scientific investigations, compiling reports, and otherwise in such manner and to such extent as may be deemed necessary or advantageous in carrying out the purposes of the Act. (Laws of 1919.)

Acting through the Director of the Division of State Parks and Lands and Waters, the Department is empowered and directed as follows: (Laws of 1919).

To have the care, custody and control of the several parks and memorials owned by the State, exclusive of forest preserves;

To make necessary rules and regulations to secure proper enforcement of the provisions of the Act;

To prepare, print, post or distribute printed matter relating to the State parks and memorials;

Subject to the approval of the Governor, to purchase or acquire by eminent domain, lands for parks or memorials and scenic and historic places;

To receive and accept in the name of the people of the state by gift or devise, the fee or other estate therein of lands or scenic or historic places;

To employ, with the approval of the proper authorities, the convicts committed to any state penal institution for the purpose of producing or planting trees, clearing, improving, repairing, draining or developing lands purchased or acquired by the State for parks or as scenic or historic places;

To have the custody of all abstracts of title, papers, contracts or memoranda relating thereto, except original deeds to the State, for any lands purchased or received for parks or preserves or as scenic or historic purposes;

To have general charge and supervision of the navigable streams and water courses of the State within the government survey meander lines;

To issue permits to take coal, sand and gravel from or under the bed of any navigable stream or water course or from or under the bed of any lake wholly within the State.

Acquiring Lands.

The Board of Commissioners for each county is authorized to acquire by purchase or otherwise any lands within such county for park purposes and to convey same to the State for park purposes; (Laws of 1927).

Such acquisitions are to be initiated by petition signed by not less than 200 taxpayers, requesting that an annual tax be imposed for acquiring lands. If before the time for hearing the petition 25% of the resident taxpayers representing 25% of the taxable property file a remonstrance the petition is required to be dismissed. If no such remonstrance is filed and the board finds such acquisition and conveyance expedient and for the best interests of the county, the petition is granted and an order entered for the purchase, fixing the maximum amount to be paid. Should there be insufficient money in the general fund to pay for the lands, the board may levy a tax upon the assessed property not to exceed one cent on each \$100 of taxable property for a period not to exceed 20 years; and may provide for the issuing of bonds to provide funds for the purchase of the lands;

Upon the filing of any such petition the commissioners are required to furnish one copy to the Governor and one copy to the Department of Conservation. No order granting any such petition may be made or entered unless and until the Governor and the Department have given their consent to the acceptance by the State of the lands described in the petition;

When any board of commissioners proposes to acquire any such lands, the board may notify the Department of Conservation of the proposed acquisition, which Department is required to inspect the lands and report to the board the suitability or unsuitability thereof for park purposes. But such report is advisory only and not mandatory to the board.

Any town, city, township or county may purchase State-owned swamp, saline and meander lands bordering on lakes and streams for public park purposes, and transfer the same to the Department as and for a State park; the Department being authorized to

establish, develop, improve and maintain the same as are other state parks; also to accept gifts, devises and bequests of any and all kinds of property of whatsoever nature for the enlargement, improvement, development, use and maintenance of the same. (Laws of 1929)

It is unlawful for any person to take, kill or shoot at, or in any manner disturb, any squirrel in any public park or state grounds. (Laws of 1911).

The Department of Conservation may, by regulation approved by the Governor, set aside, designate and maintain any state owned land for conservation purposes, or any part thereof, or any lands acquired for conservation purposes, as a public shooting ground, permitting all persons to hunt, trap or take such wild animals or wild birds in open seasons in such manner at such time and under such conditions and restrictions as may be imposed by regulation. (Laws of 1927.)

Personnel.

The personnel to operate this division consists of:

- I. Director of State Parks and Lands and Waters.
 - a. State Park Engineer
 - b. Central Office (Supervisory, administrative, technical and clerical.)
 - c. Field Personnel
 1. Park Custodians
 - a. Gatemen and laborers
 - b. Lifeguards and other technical personnel

Funds for Operation.

Funds for the operation of this division are secured from the following sources:

- I. Appropriated by the legislature
 1. Lump sum for division 10%
 2. Specific appropriations for 3%
 - a. Nancy Hanks Lincoln Memorial
 - b. Lanier Memorial
 - c. Tippecanoe Battlefield
 - d. Corydon State Capitol Building
 3. Park earnings 42%
 - a. Gate fees
 - b. Camp ground fees
 - c. Group camp fees
 - d. Swimming pools
 - e. Miscellaneous
 4. Concession Rentals 11%
 5. Revenue from sale of sand, gravel and other minerals from public waters 30%
 6. Other 4%

During the past fiscal year the park earnings as outlined above were over \$108,000.00 and the concession fees \$44,000.00. Thus the state parks themselves earned for the State of Indiana \$152,000.00. It is the aim of this division that all the State

parks become self-operating.

Under the laws regulating the operation of the State Parks Division it is its duty to acquire, operate and maintain state parks, state memorials and areas of historic significance. When such areas are found they must be investigated and considered as to their qualifications as parks or memorials, their facilities for recreation, their accessibility and the means by which they may be acquired. Such acquisition has been generally by gift from various counties, supplemented by small purchases of necessary land. Areas may be so acquired or they may be purchased outright or purchased by a state tax levy.

Protection of Properties.

After such areas are acquired it becomes necessary that they be protected from destruction, made accessible to the public, and so developed that they furnish a maximum of enjoyment and recreation. In the proper design and construction of state park areas certain elements must be considered. The first principle is that the State, as the agency of the people, is under a direct obligation to them to preserve some part of the original and unspoiled Indiana. On such public preserves it is then necessary and proper to furnish all opportunities and facilities to promote the fullest use and enjoyment of the property and at the same time protect and preserve those elements for which the area was acquired.

Improvements, etc.

The steps to be followed in proper park development, and which are followed by this division, are:

- I. Selections of various use areas within the property
 1. Picnic grounds
 2. Camp grounds
 3. Recreation areas
 4. Service areas
 - a. Garages
 - b. Storage space
 - c. Work shops
 - d. Custodian quarters
 5. Building locations
 - a. Hotels
 - b. Concessions
 - c. Group Camps
- II. Development of use areas.
 1. Water supplies. Pure tested water supplied in sufficient quantity to serve for drinking, sanitary requirements and fire protection.
 2. Sanitary facilities. Modern toilets wherever possible for picnic grounds. Toilets, showers and laundries for camp grounds, and sewage disposal for hotels, concessions, group camps and other buildings. Garbage disposal.
 3. Equipment. Tables, benches, ovens, wood, play apparatus and other articles that promote the proper use of each area.

4. Buildings. Oven shelters for picnic and camp grounds, outdoor fireplaces, shelter houses with cooking facilities and trailside shelters are provided.

III. Development of trails and roads.

The next step in developing the whole property is to make the necessary connections between the use areas and the various building locations. Roads must be constructed from the point of entrance to the various areas; parking facilities provided and access gained to buildings. Foot paths and trails supplement the roads between various areas and buildings.

IV. Development for recreation.

1. Hiking trails
2. Horse trails and saddle barns
3. Play grounds
4. Swimming pools and beaches
5. Nature trails
6. Museums
7. Wildlife exhibits

V. Developments for overnight accommodations.

1. Camp grounds and trailer camps. Camping is permitted at all twelve state parks and camp grounds are developed and set aside for this purpose. The fee is 25 cents per each camp site per day. Boy and Girl Scouts in groups, with small tents, are charged 5 cents per person per day. Modern toilets, showers and laundry facilities are provided at Turkey Run, Pokagon, Dunes, Spring Mill and Shakamak. Electricity is available for trailers at Turkey Run, Pokagon, Spring Mill and Shakamak. In all areas there are spaces for cars, tents and trailers, water, wood, stoves, tables and shelters. Last year 14,514 overnight camps were established.
2. Group camps accommodations for from 60 to 480 persons each are a part of the state park facilities. These camps consist of a mess hall, kitchen with all equipment, table service and cooking utensils; a toilet and shower building; bunk houses accommodating from 8 to 40 persons each. The charge is 25 cents per day for each person and includes one hour in the swimming pool each day. Group camps are located in the following parks:

Name	Number Accommodated	Swimming Accommodations	Number per Bunk House
Dunes	128	Beach	16
Pokagon	60	Beach	30
Shakamak	480	Beach	40
McCormick's Creek			
McCormick	160	Pool	40
Na-Wa-Kwa	160	Pool	40
Friendly	64	Pool	8

Last year there were 14,864 overnight occupancies of these buildings.

3. Cabins and lodges. Overnight cabins have been established in several of the state parks. There are cabins available at Dunes State Park on a yearly lease basis. Cabins at Turkey Run State Park are operated in connection with the hotel and are used in the same manner

as hotel rooms. There are six cabins at Shakamak State Park accommodating from four to eight persons each, furnished except for bedding and cooking utensils. Twenty cabins are located at Brown County State Park in connection with a central lodge, having a total capacity of 96 persons. The cabins are two-, three- and four-bedroom, living room and kitchen each.

4. Hotels. The State park hotel has proved a most popular addition to the Indiana state park system. Such accommodation will seldom be found in any other state. These buildings are built by the State and leased to a concessionnaire who furnishes, equips and operates them. The rates at these state park hotels vary from \$2.75 to \$3.75 per day for room and meals. Hotels are located in the following state parks:

<u>Name</u>	<u>No. of Rooms</u>	<u>Rates</u>
Turkey Run Inn	114	\$3.00 to \$3.75
Canyon Inn	30	2.50 to 3.50
(McCormick's Creek)		
Potawatomi Inn	55	3.50 to 3.75
(Pokagon)		
Clifty Inn	85	3.00 to 3.75
Duneside Inn	27	2.50 to 3.00
Dunes Arcade Hotel	50	(Rooms) 1.50 to 2.25
(European Plan)		
Muscatatuck Inn	14	2.25 to 2.75

V. Maintenance of Areas.

It is necessary to maintain all the physical plant at all times. After the development of the area is started everything is kept in first class condition. The major portion of time and labor is used to maintain the use areas, roads, buildings and equipment. This is one of the most important duties of the Division of State Parks.

VI. Other Operations.

1. Protection and feeding of wildlife.
 - a. Bird shelters
 - b. Spot planting
 - c. Feeding stations
2. Propagation of fish
 - a. Hatcheries at Shakamak, Lincoln and Pokagon state parks
3. Reforestation with native species.
4. Soil conservation and erosion control
 - a. Check dams
 - b. Plantings
 - c. Seeding and sodding slopes and eroded areas.

LIST OF STATE PARKS

At the present time this division has under its supervision twelve state parks and five state memorials with a total area of 13,958.51 acres. The following is a list of the properties with the date of acquisition, acreage, location and attendance for the past two years and 1933:

<u>Name</u>	<u>County</u>	<u>Date</u>		<u>Acreage</u>	<u>Attendance</u>		
		<u>Acquired</u>			<u>1936</u>	<u>1935</u>	<u>1933</u>
McCormicks Creek	Owen	1916		662.10	64059	40243	21625
Turkey Run	Parke	1916		1301.49	181006	147304	93041
Clifty Falls	Jefferson	1920		617.54	101057	97563	64439
Muscatatuck	Jennings	1921		204.42	No gate admission		
Pokagon	Steuben	1925		937.22	39005	21433	17291
Dunes	Porter	1925		2220.62	199267	175510	192106
Spring Mill	Lawrence	1927		1373.90	96647	68560	47307
Shakamak	Clay, Sullivan & Greene	1929		1021.57	60372	51053	26991
Brown County	Brown	1930		3821.57	108609	112573	76575
Mounds	Madison	1930		251.83	24475	21374	13696
Bass Lake	Starke	1931		10	No gate admission		
Lincoln	Spencer	1932		1556.25	No gate admission-gate to start April 1, 1937.		

MEMORIALS

Corydon State Capitol	Harrison	1917	--	3213	3232
Deam Oak	Wells	1923	.41	No record kept	
Tippecanoe Battlefield	Tippecanoe	1925	16.	No record kept	
Lanier Home	Jefferson	1926	--	15000	15000
Pigeon Roost	Scott	1929		No record kept	

Description of Parks and Facilities.

McCormick's Creek State Park is located on road 46 near Spencer. It is noted chiefly for the low falls in McCormick's Creek and the large canyon formed by the creek between the falls and White River. The canyon is cut through limestone and at one time was thought to be a cave through which the creek ran. There are about 400 acres of good timber located on this area. Recreation consists of hiking, picnicking, camping, swimming, tennis, group camping, horseback riding and nature guide lectures.

TURKEY RUN STATE PARK is located on road 47 ten miles north of Rockville. This park is noted chiefly for its geological formations and rugged canyons formed in the glacial period. There are large tracts of virgin timber located in the area. Available recreations are picnicking, camping, hiking, horseback riding,

fishing, swimming, archery, tennis and nature guide service.

CLIFTY FALLS STATE PARK is located on roads 107 and 56 near Madison. It is a high wooded plateau, cut by a deep canyon, overlooking the Ohio River. The various falls occurring in Clifty Creek and Little Clifty Creek form some of the points of interest. Recreations available are horseback riding, hiking, picnicking, camping, tennis and nature guide service.

MUSCATATUCK STATE PARK, on state road 7 near North Vernon, is situated on the banks of the Muscatatuck River and embraces some of the finest scenery found in this region. The area is rugged in character, cut by deep rocky gorges, and almost wholly covered with timber. Recreation facilities available are hiking, camping, picnicking and fishing.

POKAGON STATE PARK is located on road 27, six miles north of Angola. It is in the heart of the Northern Indiana lake country on the shores of Lake James and Snow Lake, in the region where the Potawatomi Indian tribe ruled for many years. The park takes its name from Pokagon, one of the chiefs. The lakes furnish excellent fishing, boating and bathing throughout the summer. Deer, buffalo and elk constitute the wild life exhibit. Other recreations are hiking, picnicking, tennis, horseback riding and nature study.

INDIANA DUNES STATE PARK is located on roads 12 and 49 between Gary and Michigan City, and embraces three miles of the finest sand beach on Lake Michigan. The park is noted chiefly for the numerous sand dunes, both moving and fixed, which occur in this region. It is one of the very few places where the sand dunes have been preserved for the public. Behind the dunes are densely forested areas including a large section of marsh land. The plant life of the area is exceedingly interesting since it includes such northern species as pines, blueberries, various forms of juniper and through nearly the whole list of Midwestern trees and shrubs down to the flowering cactus. It is perhaps the only area in this state where such a great variety of plant life occurs. In addition to swimming and boating there is hiking, nature study and areas set aside for camping and picnicking.

SPRING MILL STATE PARK is located on road 60 near Mitchell, 11 miles south of Bedford. The chief items of attraction are the reconstructed pioneer village, including the original water-powered grist mill, the reconstructed saw mill, buildings housing the various industries such as the hat shop, the post office, the still house, the boot shop, apothecary shop, lime kilns, etc. In addition to these, many of the original residence buildings have either been reconstructed or other buildings of the same period moved in and built upon the original foundations. Aside from the village there are many caves in the area, the most important of which are Donaldson Cave, Upper and Lower Twin Caves and Bronson Cave, all of which contain many beautiful and original formations. Streams in Donaldson and Twin caves contain rare species of blind fish. Boat trips may be taken in Twin

Caves for 25 cents per person, and Lower Twin cave and Donaldson cave may be partially explored on foot. No guides are available except for the boat trips. There is approximately 100 acres of virgin timber land with some of the largest specimens of white oak and yellow poplar in this section of the country. An artificial lake of approximately 30 acres is now under construction and will offer excellent swimming, boating and fishing. At present the recreational facilities in Spring Mill consist of cave trips, camping, hiking and picnicking.

SHAKAMAK STATE PARK is located on roads 48 and 159 near Jasonville in the heart of the Indiana coal mining area. Its name is taken from the Indian name for Eel River, which means "River of Long Fish". The park contains two beautiful artificial lakes of 57 and 40 acres. The area is used chiefly for swimming and fishing and as a center for the 4-H club group camps. The group camps will not be available this summer, since the buildings are being used by the CCC camp. Recreations are boating, fishing, swimming, hiking, picnicking, camping, nature study, and tennis.

BROWN COUNTY STATE PARK is located on roads 46 and 135 near Nashville. This area comprises nearly 4,000 acres of the famous Brown County hill country, widely advertised as the home of Abe Martin and the location for numerous artists. It is comprised wholly of typical Southern Indiana hill land, heavily wooded and noted for its remarkable brilliant fall coloring. The Brown County Game Preserve of over 11,000 acres joins the park on the south and is equally noted for its scenic beauty, drives, trails, lakes and streams. Recreations are picnicking, camping, hiking, swimming, horseback riding, archery, nature study and wildlife exhibit.

THE MOUNDS STATE PARK, located on road 67 near Anderson, was set aside as a state park to preserve the rare examples of the Mound Builders' work. The largest work consists of a great earthen mound encircled by an earthen wall 1200 feet in circumference and nine feet high. This is said to be Indiana's largest and best preserved example of the Mound Builders' art. The park is in a heavily wooded area bordering White River and in addition to the large mound has several smaller examples of this prehistoric civilization. Horseback riding is available, as well as camping, fishing, picnicking, hiking and nature study.

BASS LAKE BEACH is located on state road 10 near Knox, a small area on the shore of Indiana's fourth largest lake, and the only area surrounding the lake which is available to the public, the rest of the lake shore being entirely privately owned. It is an attractive outing place for swimming, boating, fishing, picnicking and camping. It has an excellent sloping sandy beach, pier and diving tower. Modern dressing room facilities, lounge and dining room are all found in the pavilion.

Div. of Lands & Waters & Parks

NANCY HANKS LINCOLN MEMORIAL is situated on road 162, just off road 45, amid the rolling wooded hills of Spencer County, a lovely setting for the State's tribute to the mother of Abraham Lincoln. On the hilltops in the memorial area are the grave of Nancy Hanks Lincoln and the site of the cabin to which Thomas Lincoln brought his family from Kentucky in 1816. Here Abraham Lincoln spent fourteen of the formative years of his life. The hearthstones from the Lincoln cabin are a part of the memorial. Across the highway from the memorial is Lincoln State Park with its beautiful lake, drives, seven miles of trails, the picnic, camping and recreation areas with their shelter houses, ovens, pure drinking water and sanitary facilities.

THE OLD STATE CAPITOL AT CORYDON, on roads 62 and 135, became a state memorial in 1917. The birthplace of the Hoosier state, scene of the first constitutional convention and seat of Indiana's government for nearly a decade, the capitol building at Corydon is rich in history and sentiment. Designed in 1812 as a courthouse for Harrison County, the building became the seat of territorial government upon its completion in 1816. The forty-four delegates to the constitutional convention assembled here in June of that year and it was here that officers of the new state took their oaths when Indiana was admitted to the Union on December 11, 1816. Corydon remained the seat of government until late in 1824 when Indianapolis became the permanent capital of the state. The building has been restored and contains much of the original woodwork and furnishings.

DEAM OAK, a rare hybrid discovered in 1904 in a woods near Bluffton, is named for Charles C. Deam, an authority on trees and shrubs. In order to preserve it, about a third of an acre of ground on which the tree stands was purchased and given to the State. Seeds and seedlings from this tree have been distributed to the principal botanical gardens of the United States.

TIPPECANOE BATTLEFIELD, on road 43 north of Lafayette, commemorates the battle of Tippecanoe, which ended the military power of the Indians, and was a most important event in the history of the Northwest Territory. The battle was fought on November 7, 1811. The monument was erected in 1907 and became a state memorial in 1925.

THE JAMES F. D. LANIER HOME, in Madison, on roads 7, 29, 56 and 62, was built in the days before the Civil War by one of Indiana's distinguished and patriotic sons. It has been refurnished with the original possessions of the Lanier family, and gives an authentic picture of the cultured life of that period. The beautiful house overlooks the Ohio River.

PIGEON ROOST MEMORIAL, on road 31, near Underwood, Scott County, commemorates one of the last massacres of pioneer settlers by the Indians who resented their coming. The little white settlement of Pigeon Roost took its name from the flocks of passenger pigeons - now extinct - which roosted in the surrounding forest.

CHARGES AND FEES AT THE PARKS

1. Gate admission - 10 cents per person; no charge under 8 years.
2. Camp ground - 25 cents per camp site per day. Includes wood, water tables, laundry, toilets, etc.
3. Trailers - 25 cents per camp site per day; with electricity 50¢.
4. Swimming -
 - a. In pools - 15 cents per person on week days;
25 cents on Saturday afternoons and Sundays.
 - b. Beaches - no charge for swimming; 10 and 25 cents for bath house privileges.
5. Saddle horses - 50¢ to \$1.00 per hour.
6. Group Camps - 25 cents per day per person.
7. Cave trip, Spring Mill - 10 and 25 cents per person.
8. Hotel accommodations - \$2.75 to \$3.75 per day per person, including meals.
9. Meals - 35 cents to \$1.00, a la carte.

RESUME OF AREAS FACILITIES AND FEES

Bass Lake Beach

On Road 10	Starke County	Near Knox
10 acres	Acquired 1931	No admission charge
Value of area and improvements		\$25,000.00

Camp grounds
 Concession stand - Sandwiches, soft drinks, 10¢ for bathhouse
 Meals 35 and 70 cents
 Swimming
 Fishing
 Picnic grounds
 Modern sanitary facilities
 Pure drinking water

Brown County State Park

Attendance, 1936 108,609

On roads 46 and 135	Brown County	Near Nashville
3821.57 Acres	Acquired 1930	Admission 10¢
Value of area and improvements		\$600,000.00

Abe Martin Lodge and Cabins Accommodate 96 Rates:
 4 to 8 persons per
 cabin
 \$1.00 to \$3.00 per
 day

Meals - served at Lodge \$0.75 and \$1.00
 Camp grounds - Modern Sanitation 25¢ per camp site per day
 Concession stand - Soft drinks, sandwiches, souvenirs
 Swimming pool 15¢ week days; 25¢ Saturday
 afternoon and
 Sunday

Hiking - 15 miles of foot trails
 Horseback Riding - 75 miles of trails \$1.00 per hour
 Archery range
 Archery hunting in season
 Picnic grounds and equipment - Shelters
 Nature guides and lectures
 Tennis
 Recreation field
 Children's play equipment
 Wildlife exhibit - in game preserve
 Park drives - 12 miles
 Modern sanitary facilities
 Pure drinking water
 Facilities for group meetings - Outdoor amphitheatre and shelters.

CLIFTY FALLS STATE PARK

Attendance, 1936 101,057

On roads 7, 107, 56 and 62	Jefferson County	Near Madison
617.54 acres	Acquired 1920	Admission 10¢
Value of area and improvements		\$460,000.00

Hotel - Clifty Inn	80 rooms	Rates: \$3.00 to 3.75 per person American plan
Camp grounds - Modern toilets -		25¢ per day per camp site
Concession stand - soft drinks, sandwiches, etc.		
Meals - at hotel		\$0.75 and \$1.00
Hiking - 25 miles of trails		
Horseback riding - 20 miles of trails		75¢ per hour
Picnic grounds and equipment - Shelters		
Nature guides and lectures		
Tennis		
Recreation field		
Children's playground equipment		
Park drives - 6 miles		
Modern sanitary facilities		
Pure drinking water		
Facilities for group meetings - Shelters and hotel lobby		

DUNES STATE PARK

Attendance 1936 199,267

On roads 12 and 49	Porter County	Between Michigan City and Gary On Lake Michigan
2220.62 acres	Acquired 1925	Admission 10¢ per person
Value of area and improvements		\$1,800,000.00

Hotel - Dunes Arcade	50 rooms	Rates: \$1.50 to \$2.00 (European)
Duneside Inn	27 rooms	Rates: \$2.50 to \$3.00 (American)
Campgrounds - Modern sanitation, showers, laundry		25¢ per camp site per day
Group camp -	128 persons	25¢ per person per day
Concession stand - Refreshments, sandwiches, etc.		
Meals - a la carte - sandwiches to \$1.25 dinners		
Grocery in picnic area		
Swimming - 3 mile beach on Lake Michigan		No charge
Bath house facilities		25¢ per person
Hiking - 12 miles of trails		
Picnic grounds and equipment - Shelters		

"Div. of Lands & Waters & Parks"

Nature guides and lectures
 Recreation fields
 Park drives - 10 miles
 Modern sanitary facilities
 Pure drinking water
 Facilities for group meetings - Shelters

LINCOLN PARK AND NANCY HANKS LINCOLN MEMORIAL

On road 62	Spencer County	South of Dale, Indiana
1556.25 acres	Acquired 1932	Admission 10¢
Value of area and improvements		\$200,000.00

Camp grounds	25¢ per camp site per day
Artificial lake - 30 acres	
Fishing	
Hiking - 10 miles of foot trails	
Picnic grounds and equipment - shelters	
Tennis	
Recreation field	
Children's play equipment	
Park drives - 3 miles	
Pure drinking water	
Facilities for group meetings - Shelters	

MCCORMICK'S CREEK STATE PARK

Attendance 1936	64,059
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On road 46	Owen County	Near Spencer
662.10 acres	Acquired 1916	Admission 10¢
Value of area and improvements		\$330,000.00

Hotel - Canyon Inn	30 Rooms	Rates: \$2.75 to \$3.00 (American Plan)
Cabin - 1	4 Rooms	Rates: Same as hotel
Camp ground - Modern sanitary facilities		25¢ per camp site per day
Group camps - 3, accomodating 150, 150 and 64		25¢ per person per day
Concession stand - soft drinks, sandwiches, etc.		
Meals - at hotel		50¢ to \$1.00
Swimming in pool		15¢ per person week days
		25¢ Saturday after-noon and Sunday
Fishing - in White River		
Hiking - 12 miles of foot trails		

"Div. of Lands & Waters & Parks"

Horseback riding - 10 miles of trails 50¢ per hour
 Picnic grounds and equipment - shelters
 Nature guides and lectures
 Tennis
 Recreation field
 Children's playground equipment
 Museum of Natural History
 Wildlife exhibit
 Park drives - 5 miles
 Modern toilets
 Pure drinking water
 Facilities for group meetings - Amphitheatre and shelters

MOUNDS STATE PARK

Attendance 1936 24,475

On roads 67 and 32	Madison County	Near Anderson
251.83 acres	Acquired 1930	Admission 10¢
Value of area and improvements		\$175,000.00

Camp grounds	25¢ per camp site per day
Concession stand and Pavilion - soft drinks, sandwiches, etc.	
Meals - at Pavilion	50¢ to \$1.00
Fishing in White River	
Hiking - 6 miles of foot trails	
Horseback riding - 5 miles of trails	50¢ and 75¢ per hour
Picnic grounds and equipment - Shelters	
Recreation field	
Children's playground equipment	
Park drives - 1 mile	
Pure drinking water	
Facilities for group meetings - Shelters - Pavilion	

MUSCATATUCK STATE PARK

On roads 3 and 7	Jennings County	Near North Vernon
204.42 acres	Acquired 1921	No admission charge
Value of area and improvements		\$50,000.00

Hotel - Muscatatuck Inn	14 rooms	Rates: \$2.25 to 2.75 (American)
Cabins - 2	8 rooms	Rates: Same
Camp grounds		
Meals - at Inn		50 and 75 cents
Fishing in Muscatatuck River		
Hiking - 3 miles of trails		

"Div. of Lands & Waters & Parks"

Picnic grounds and equipment - Shelter
Park drive - 1 mile
Pure drinking water

POKAGON STATE PARK

Attendance, 1936 39,005

On Road 27	Steuben County	North of Angola
937.22 acres	Acquired 1925	Admission 10¢
Value of area and improvements		\$325,000.00

Hotel - Potawatomi Inn	55 rooms	Rates: \$3.50 and 3.75 per day (American Plan)
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Camp grounds - Modern sanitation, electricity	25¢ per camp site per day;
Showers, Laundry	with electricity 50¢ per day

Group camp - Accomodating 60 persons	25¢ per person per day
Concession stand - soft drinks, sandwiches, groceries, etc.	

Meals - at hotel	75¢ and \$1.00
Swimming in Lake James - No charge	10¢ for bathhouse

Fishing in Lake James	
Boating in Lake James	Boats from Lake Boat Livery

Hiking - 5 miles of trails	
Horseback riding - 10 miles of trails	\$1.00 per hour

Archery Range
Archery hunting in season
Picnic grounds and equipment - Shelters
Tennis
Recreation field
Children's playground equipment
Wildlife exhibit - Deer, buffalo and elk
Park drive - 5 miles
Modern sanitary facilities
Pure drinking water
Facilities for group meetings - Hotel lobby and shelters

SHAKAMAK STATE PARK

Attendance, 1936 60,372

On roads 48 and 159	Clay, Sullivan and Greene Counties	
	Near Jasonville	
1021.57 acres	Acquired in 1929	Admission 10¢
Value of area and improvements		\$350,000.00

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Cabins - 6	Accommodating 26 persons	Rates: \$10.00 to \$25.00 per week
Camp grounds - modern sanitary facilities, electricity, showers and laundry		25¢ per camp site per day; with electricity, 50¢ per day
Pavilion - Soft drinks, meals, etc.		
Meals - at Pavilion		50¢ to 75¢
2 Artificial Lakes - 40 and 57 acres		
Swimming at beach, no charge		10¢ for bathhouse
Fishing in both lakes		
Boating in both lakes		25¢ per hour
Hiking - 10 miles of trails		
Picnic grounds and equipment - Shelters		
Tennis		
Recreation field		
Children's playground equipment		
Wildlife exhibit - Deer, buffalo, elk, birds		
Park drives - 6 miles		
Modern sanitary facilities		
Pure drinking water		
Facilities for group meetings - shelters and amphitheatre		
Group Camp - Accommodates 480		25¢ per person per day

SPRING MILL STATE PARK

Attendance, 1936 96,647

On road 60	Lawrence County	11 miles south of Bedford
1373.90 acres	Acquired 1927	Admission 10¢
Value of area and improvements		\$400,000.00

Campground - Modern sanitation, electricity showers and laundry	25¢ per camp site per day; with electricity 50¢ per day
Concession stand - soft drinks, ice cream, etc.	
Meals - at Tavern in village	35¢ to \$1.00
Hiking - 10 miles of trails	
Picnic ground and equipment - shelter	
Pioneer village, mill, industries, dwellings, etc.	
Caves - boat trips through caves	10¢ and 25¢ per person
Children's playground equipment	
Museum - most complete exhibit of pioneer articles	
Park drives - 6 miles	
Modern sanitation	
Pure drinking water	
Facilities for group meetings - Shelters	

"Div. of Lands & Waters & Parks"

TURKEY RUN STATE PARK

Attendance, 1936 181,006

On road 47 near 41	Parke County	North of Rockville
1301.49 acres	Acquired in 1916	Admission 10¢
Value of area and improvements		\$450,000.00

Hotel - Turkey Run Inn	114 rooms	Rates: \$2.75 to 3.75 per day
Cabins - with hotel room accommodations only		Rates: Same as above
Camp ground - Modern sanitation, electricity, showers and laundry		25¢ per camp site per day; with electrici- ty 50¢ per day
Concession stand - Meals, refreshments, groceries, etc.		
Meals at Hotel		75¢ and \$1.00
Meals at Pavilion		A la carte
Swimming in Sugar Creek		
Fishing in Sugar Creek		
Hiking - 30 miles of trails		
Horseback riding - 20 miles of trails		\$1.00 per hour
Archery range		
Picnic grounds and equipment - shelters		
Nature guides and lectures		
Tennis		
Recreation field		
Children's playground equipment		
Museum		
Park drives - 3 miles		
Modern sanitary facilities		
Pure drinking water		
Facilities for group meetings - Hotel lobby and shelters		

RESUME OF AREAS FACILITIES AND FEES (Continued)

MEMORIALSCORYDON STATE CAPITOL

Attendance, 1936, 3,213

On roads 135 and 62	Harrison County	At Corydon
Acquired, 1917		Admission 10¢
Value of property		\$70,000.00

Old original State Capitol Building, completed in 1816. Used as seat of State Government until 1824. Completely restored and furnished.

DEAM OAK

Near State Road 3	Wells County	Near Bluffton
.41 acres, acquired in 1923		No admission
Value of property		\$500.00

A rare hybrid tree, discovered in 1904 and named in honor of C. C. Deam, noted botanist. Only one of its kind known. Seeds have been distributed widely to principal botanical gardens of the United States.

JAMES F. D. LANIER MEMORIAL

On roads 7, 29, 56, 62.	Jefferson County	In Madison
Acquired in 1926		Admission 25¢ per person
		Children in groups of 10
		10¢
Value of property		\$125,000.00

Restored home of James F. D. Lanier, built in 1843. One of the finest examples of the architecture of its day, refurnished with possessions of the family.

PIGEON ROOST

On Road 31	Scott County	Near Underwood
Acquired in 1929		No admission
Value of property		\$5,000.00

A stone monument marking one of the last Indian massacres, that of the Pigeon Roost Settlement, in 1812.

TIPPECANOE BATTLEFIELD

On road 43	Tippecanoe County	Near Lafayette
Acquired in 1925		No admission
Value of property and improvements		\$25,000.00

Picnic grounds and equipment
Modern sanitation
Pure drinking water

Monument commemorating the battle of Tippecanoe, November 7, 1811, when the whites, lead by William Henry Harrison, decisively defeated the Indian tribes.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

DIVISION OF ENTOMOLOGY

The office of the State Entomologist was created in the 1907 session of the legislature and was created in an effort to control San Jose Scale which at that time was being rapidly distributed all over the United States and threatened the destruction of orchards.

Funds for the operation of this division at the present time are an apportionment of the general fund of the Conservation Department appropriation which is fixed by the legislature. In addition to this the Division collects moneys for the issuance of licenses for agents and dealers of nursery stock.

The Division is headed by a director, who is known as the State Entomologist, in charge of all activities. The personnel of the office is composed of three full time field men in addition to one secretary, and during the summer season the added work necessitates the employment of from 40 to 50 additional men.

The Division maintains a sub-station at Auburn, Indiana, which has been maintained for the purpose of carrying out the European Corn Borer program. From one to three men have been employed at this station since its establishment in 1926.

A force of from three to six men are employed for the inspection of nursery stock and two men for the inspection of agricultural products. In addition to this there is a chief apiary inspector, who is a full time employe, and who has from six to ten deputies working under him during the summer season.

The services rendered are inter-departmental and of a public nature which also includes cooperation with the U.S. Department of Agriculture through its Bureau of Entomology and Plant Quarantine and the Bureau of Plant Industry.

We are called upon by many organizations and individuals to aid with their insect problems but to explain all of the services rendered to these various groups would be a lengthy job. A few examples will be cited to illustrate this work.

Cases of inter-department service are often as follows, the Forestry Division may have some insect problem developing in one of its nurseries. Immediately they seek information from this division on the nature of the insect and the steps to be taken to control the pest. If proper and prompt precautions are taken a great amount of destruction may be prevented. The Division of Fish and Game may seek advice or knowledge on various insect problems which arise in their work such as the life history and habitats of insects which may serve as fish food or be destructive to fish or game.

The law provides that the State Entomologist shall devote his entire time to the discharge of the duties of his office. He shall cooperate with any local horticultural society or individual in the state in any effort to locate, check or eradicate the San Jose Scale or any insect pest injurious to orchard or field crops or to shade and ornamental trees. He shall also assist in identifying and combating fungus or other destructive diseases to plant life. In the discharge of his duties he shall go to any part of the State where his services are requested and his duties will permit. He

shall, immediately upon taking office, prepare and cause to be published and from time to time thereafter in pamphlet form, all available information relating to San Jose Scale and other injurious plant diseases, with the methods of detecting the same and the modes of treatment.

Thus the public is served by telephone office calls and correspondence. No day passes but what there are from fifteen to fifty telephone calls, and all day long during the spring and summer season the telephone is never idle more than a few minutes between calls. Office calls (people who come to the office in person for information) take a considerable amount of time during the spring and summer season: one man is kept busy doing nothing else but to talk to people who come in seeking information. On some Saturdays, when the field men are usually in the office, there have been occasions when each one was busy with an interview and with several other people waiting. Those who are unable to reach the office either by telephone or by a personal call, use the mail. A day never passes but what there are several inquiries about some insect or disease problem. In the various letters, questions, telephone calls, etc., there are queries which will range from bedbugs and clothes moths to dog ticks and scale insects on shrubs and ants in the lawn. Requests for information regarding termites constitutes a large portion of the inquiries. Diseases of plants constitute another large part of the inquiries. To one who is not familiar with the questions which can be asked, he does not realize the difficulty often encountered. To the layman the description of an insect may be so different from what it actually is that it would be as far apart as a dog is from an elephant.

Here should be emphasized the importance and sometimes the necessity of bringing or sending to the office specimens of the particular insects or diseases that are causing trouble. This would greatly speed up positive identification and would enable the office to immediately give recommendations for control.

Summing it all up the total number of inquiries pertaining to insects and diseases would total somewhere in the neighborhood of 10 to 15,000 inquiries per year.

This Division cooperates with the U.S.D.A. through its Bureaus in several different ways. Some of the projects through which cooperation was established can be mentioned, such as, European Corn Borer, Japanese Beetle, Dutch Elm Disease, Phony Peach Disease survey and inspection of foreign grown root stocks and bulbs. To cite examples of cooperation with the U.S.D.A., take the inspection of foreign grown root stocks and bulbs. The Hill Floral Products Company of Richmond, Indiana, annually import about one million rose root stocks grown in Europe and shipped here, on to which is grafted a known variety of rose. These rose stocks are subjected to a very thorough inspection at the time they leave the foreign port. However, they must again be inspected upon arrival in this country since it is desired to make a double check as to their freedom from diseases and insects. In order that this stock may arrive at its point of destination with the least damage to those plants there has been an agreement between the U.S.D.A. and the Division of Entomology whereby rather than having this stock unpacked at the port of arrival and inspected, that it will be forwarded to its destin-

ation and the stock inspected by the inspectors of the Division of Entomology. The report of the inspectors of the Division is accepted by the officials of the U.S.D.A. Through this service it can be seen that there will be less loss of plants on the part of the buyer, and also that should a shipment come in which is attacked by some insect or disease, it can be disposed of before it gets into the channels of production or trade. There is also the possibility of importing some new insect or disease which would show up in these inspections.

Another case of cooperation with the U.S.D.A. can be cited in the phony peach disease survey. During the past two or three years surveys have been made, particularly in the peach growing areas of Indiana, to determine whether or not a disease known as Phony Peach existed in this State. A representative from the phony peach disease laboratory of the U.S.D.A. comes to Indiana and he with a representative of our office scouts the peach orchards in an effort to locate any phony peach trees. Last year the time required on this survey took about one month and then it was only due to the rush work that compelled the discontinuance of a further survey. To date only one tree has been found in Indiana and this was promptly removed after positive identification. Other cooperative programs with the U.S.D.A. could be mentioned but these two will give you an idea of this function.

Cooperation is rendered through the Division to organizations such as nurserymen's associations, florists' associations, corn growers associations, gladiolus societies, dahlia societies, and the Indiana Cannery Association, etc. The Division is continually working with these organizations in an effort to help them become better acquainted with insect and disease problems so that they can recognize a pest before it gets to the point of doing damage. They are kept informed as to the best materials which can be used in controlling any insect or disease outbreak; likewise, should some material be placed on sale for control purposes which would have damaging effect on plant growth, these organizations are advised so that they will be better able to avoid any possible chance of great losses through their use. Aid is given to these organizations in recommendations on cultural practices necessary to avoid insect or disease outbreak.

In the case of the Indiana Cannery Association, cooperation is carried on with the Purdue Agricultural Experiment Station, endeavoring to bring about a better tomato plant which is more adaptable to Indiana conditions and high production qualities. The object of tomato seed certification is to produce a high grade tomato seed practically free from varietal mixtures and seed borne diseases and to provide a service to producers of tomato seed in Indiana whereby they can successfully market their produce in competition with growers in other regions. The certification of this seed has been a cooperative program between the Purdue Agricultural Experiment Station and the Division of Entomology in that a representative from one or the other offices periodically inspects the plants growing in the field, at harvest time, at the time the seed is taken from the pulp and placed in the storage bins, and finally at packaging time.

In this way a great service is rendered to the producers of tomatoes and tomato seed in Indiana.

Another service to the individuals is the making special calls or visits to places where damage by insects or disease may be in progress. Many times serious outbreaks of some insect or disease can be prevented by calling on some individual who is having trouble and by giving him proper information, which if immediately practiced, will bring this outbreak under control. Many times calls have been made to examine houses that are infested with termites and suggestions have been offered as to how treatment can be applied to bring the termite infestation under control.

A slightly different way in which individuals or groups have been served during the past few years has been the inspection of agricultural products originating in Indiana and bound for other states, particularly those to the west and south. To be specific, Illinois and Kentucky have forbidden the importation of agricultural products from Indiana which have originated within the corn borer infested area. Since a large amount of produce grown in the northwest section of the State is taken to Chicago for their markets the Illinois authorities refused admittance unless officials of this Division certified that it was free of corn borer or had originated from outside the corn borer infested area. Had cooperation not been given in these cases, the producers in those areas would have suffered untold losses in produce left on their hands because their markets had been cut off. Every year several thousand bushels of corn is demanded by Kentucky live stock feeders, and because Kentucky is not a large corn producing state they look to Indiana for corn. Kentucky officials will not permit importation of corn unless certified by this division that it originated from outside the known corn borer infested area. The Entomologist may be called upon at any time to inspect and certify a large quantity of corn destined for Kentucky. This has enabled Indiana growers to retain their Kentucky markets for corn.

Summing up all these services you can readily see that over the short period of a year such services rendered may save the individual many thousands of dollars.

Now to spend some time on Nursery Inspection and what it involves.

Section 3 of the Acts of 1907, establishing the State Entomologist's office stated in part that the State Entomologist shall inspect all nurseries in Indiana where trees, shrubs, vines, plants or other nursery stock are grown and offered for sale, at least once a year not earlier than June first and not later than October first, at such as may be elected, and shall notify in writing the owners of such nurseries of the presence of San Jose Scale or other injurious insects or fungi on trees, shrubs, vines, plants and other stock of such nurseries, and shall notify in writing the owner of any affected stock that on or before a certain date such measures will be taken for the destruction of such insect or fungus enemies of nursery stock as have been shown to be effectual for this purpose. The said State Entomologist was thereby empowered with the authority to enter upon any premises and examine all trees, plants, shrubs, vines and fruits whatsoever in the discharge of his duties by law.

Section 4 of this act states that any person or persons who will obstruct or hinder said Entomologist in the discharge of his duties shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not less than \$10.00 nor more than \$25.00.

In 1909 the acts of 1907 were amended and in part state that every package of trees, shrubs, vines, plants or other nursery stock shipped into this State from another state or shipped within the State from one point to another, shall be labeled on the outside with the name of the consignor, the name of the consignee, and the certificate signed by a state or government inspector, showing that the contents have been examined by him and that to the best of his knowledge and belief such stock is free from San Jose Scale or other destructive insects or fungus enemies.

Section 2 of this same act in part states that whenever any trees, shrubs, vines, plants or other nursery stock are shipped into or within the State without said certificate plainly fixed on the outside of the package, box or car containing the same, the fact must be reported within twenty-four hours to the State Entomologist by the agent of the railway, express or steamboat company or other person or persons carrying or receiving the same. And any agent of any railway, express or steamboat company, or other person or persons who shall violate the provisions of this section, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in any sum not less than \$25.00 nor more than \$100.00 and costs, or imprisonment in the county jail not less than 5 nor more than 30 days, or may be so fined and imprisoned in the discretion of the court, and any such fines within the provisions of this act shall be paid over to the state treasury. On notification of the receipt of such uncertified package or packages or trees, shrubs, vines or plants, the State Entomologist shall examine or cause to be examined said package or packages at the expense of the express, railway or steamboat companies, or other person or persons carrying the same, and if found free from injurious insects and plant diseases, may allow them to pass to their destination, otherwise shall cause the same to be burned or destroyed. But in no case shall the agent of the railroad or other transportation company allow said package or packages to pass out of his possession, under penalty, until the same has been duly inspected by the State Entomologist or or his deputies.

This law has been cited to give you an idea of the requirements of the law before explaining how this work is carried on particularly relating to nursery and greenhouse inspections.

As soon as the nursery stock has emerged from its dormant state in the spring the inspectors from this Division begin to visit each and every nursery in the State at least once during the year. It is planned to start in the south end of the State and work north as the season progresses. The inspector goes to the nurseryman and identifies himself and explains his mission; then starts at some definite location in the nursery and as near as possible makes a plant by plant inspection of all the stock that is grown in the nursery. It is intended to locate any insect or any disease that may affect those plants and to make note of such insects or diseases and their host plants together with the exact location in the nursery. When

the inspection is completed the nurseryman (if it was impossible for him to go along on the inspection) is informed of the destructive insect pests and diseases which were found. Such infested or infected stock cannot be sold or removed from the nursery unless it is to be removed for destruction. If some stock in the nursery is not so severely infested or infected that it necessitates destruction, or in the opinion of the inspector can be cleaned up by application of certain spray materials or control measures, this stock is placed under quarantine and not permitted to be sold or removed until demonstrated to the satisfaction of the inspector that the pest has been completely eliminated. Many times insect infestations can be cleaned up within a very short period of time, as for example, the bagworm which is at times a serious pest on evergreens and which can do considerable amount of damage over a short period of time. If visits to a nursery disclosed that bagworms were first making their appearance, the nurseryman would be promptly informed of their presence and by immediate application of proper materials this infestation can be eliminated within a period of a week or ten days. If upon proof, by the nurseryman, satisfactory to the inspector or State Entomologist, that the infestation of bagworms has been cleaned up the inspector is only too willing to release the infested trees from quarantine and permit their sale. Generally on scale insect infestations it will take one or more years time to eliminate the infestation which means that the stock is held under quarantine until it is found to be free upon some subsequent inspection.

Sometimes some infestations are so severe that it is not worth the time and money necessitated to clean up the infestation, and then the best and surest way is to cut out and burn this infested stock. This, of course, alleviates the quarantine ban.

A major part of the time of the inspectors is spent in the inspection of nurseries and very little attention is paid to greenhouse grown stock; however, when any greenhouse grown stock is to go inter- or intra-state shipments then it becomes an obligation of the division to complete the certification, to inspect the stock and, if it is found free from injurious insects or diseases, to issue a certificate permitting its shipment. Relatively speaking greenhouse inspection covers a rather small proportion of the division's duties in the summer time but in the winter time this more or less assumes a major obligation. You can gather from what has just been stated that it behooves the inspector to be on his toes at all times for any new insect pests or plant diseases which might be coming into this State as well as to be up-to-date on the latest methods and materials used in controlling insects and diseases.

It might be stated here that the law specifies that persons desiring to sell or ship nursery stock shall make application in writing before July first of each year to the State Entomologist for an inspection of their stock. Persons failing to comply with this provision shall be liable for extra charges to cover the traveling expenses of the inspector.

Now to go into detail a little bit on some of the major projects which have arisen in the course of the past few years in the Entomologist's office, please consider the following:

First the barberry eradication program - Most people know that the common barberry is an alternate host plant for the black stem rust and leaf rust of wheat and it has been determined an undesirable plant. Considerable loss to the wheat producers is common every year by this disease to the wheat growers. Since it has been determined that the common barberry serves no specific good purpose other than as an ornamental, laws have been promulgated which make it illegal to have the common barberry growing on any premises. It has been, therefore the endeavor of the Division in cooperation with the U.S.D.A. to scout for the common barberry and eradicate all plants found. It is hoped that in due time the common barberry in Indiana will be a thing of the past.

The second project is the white pine blister rust control. This rust is a disease of the white pines which has the alternate host species of the ribes or commonly speaking, the gooseberry and currant. It is desired in the State, through the cooperation of the U.S.D.A. to eliminate the gooseberry and currant plants from those sections in which the white pine is grown under natural conditions. There are some sections in which white pine does not grow well and where these trees do not appear. In these particular sections the drive for the elimination is not so intense. However, considerable effort is being put forth to eliminate them wherever white pine is grown, thereby saving the white pine from destruction.

The third project to be considered and one with which you are perhaps much more familiar is that of the European Corn Borer, which is a very serious pest of corn. The European Corn Borer was first found in Indiana in 1926 in the northeast section of the State. The officials of Indiana knew, before its discovery within the state boundary, of its devastating ravages in those sections of the United States where it had become definitely established. When it was first found in Indiana it became a duty to attempt to hold this insect in check as long as possible and in the meantime to educate the farmers and corn growers as to its devastating effects and better prepare them with the knowledge of ways and means of combating and growing corn in competition with its ravages. As stated in the beginning, this office maintains an office at Auburn, and each year men who are capable of scouting for European corn borer are taken to that office and trained for a period of a week and then are sent out into the bordering territory along the infested area to scout for new infestations of corn borer. By doing this it has been possible to pretty well determine the extent of the spread. These scouts are also able to check on the per cent of infestation and the amount of damage which has been done within the infested area. They have cooperated with farmers and have brought to them the latest information on recommended control. Up to the present time splendid response and cooperation has been received from the farmers within the corn borer area and the extent of spread has been pretty well known.

The fourth project to befall the Division of Entomology, in the last few years, is that of the Japanese beetle. This beetle was fairly well established in some of the eastern states, namely

New Jersey and Pennsylvania, and has gradually been spreading out from those areas. The first time it was found in Indiana was in 1934, seventeen beetles having been discovered in Indianapolis that year. Traps were loaned by the U.S.D.A. and under the supervision of this division were placed systematically over the city and were attended for about two months during the summer. Since the adult beetle flight will range from the middle of June to about the middle of August, the traps are placed and attended during that time. Jap beetle traps are so constructed that a container having a material specifically attractive to the beetle, lures the beetles into it where escape is almost impossible. As soon as the trapping was completed there was a definitely defined area established where the Japanese beetle was found and a program was started immediately for treating the ground in that area in such a way as to eliminate future emergence of the adult beetles. The treatment given this area was an application of arsenate of lead in solution at the rate of 1000 pounds per acre. This was spread on the soil and then washed in with ordinary water to remove it from the surface. The larvae of the Japanese beetle feeding in the soil impregnated with arsenate of lead would be killed. The following year trapping was again done over a larger area in Indianapolis when an increased number of Japanese beetles were found. The same procedure as to treatment was again practised with a result that the year 1936 showed an appreciable decrease in the number of beetles found in Indianapolis. In addition to trapping in Indianapolis, traps were placed in the cities of Terre Haute, Vincennes, Evansville, New Albany and Jeffersonville, Richmond, Fort Wayne, South Bend, and LaFayette. Beetles were found only in two of these cities, namely Fort Wayne and South Bend. The number of beetles caught in these two cities were so small that there is some doubt as to whether there is an established infestation; however, treatment will be applied in the area in which they were found in Fort Wayne, but because of the small number caught and the peculiar location in South Bend (around a railroad yard) no treatment will be given there this year. It is the intention of this Division to again trap in Indianapolis, Fort Wayne and South Bend, and perhaps some other cities within the State.

The Japanese beetle is a rather generous feeder, feeding in the adult stage on the foliage and fruit of practically any species of trees, shrubs or plants. While in the larval stage it feeds on the underground portions of plants. In the adult stage, during their flying and feeding period, they probably are one of the most destructive insects that we will have to contend with. In the larval stage they are particularly damaging to lawns and golf courses.

The fifth and last project to be discussed is that of the Dutch Elm Disease. The Dutch elm disease was so named because it was first discovered in Holland. It was introduced into this country on logs which were shipped here for veneer purposes. The disease was first established and found in some of the eastern states and since some of the logs were shipped to some of the Indiana veneer mills, a survey was made in the vicinity around these mills and in 1934 some infected trees were found for the first time. Since there is no hope of saving the tree once the disease is definitely established in it, the only means of control is readication and burning of the trees.

So far infected trees have only been found in Indianapolis. There was a light increase in the number of trees diseased in 1936, but due to a rather intensive survey made of the entire area in and around Indianapolis it is believed that perhaps the sources of infection are pretty well eliminated; however, more scouting will be done in coming years in order to make this a certainty.

The Dutch Elm Disease only attacks elm trees and so far as is known is carried from one tree to another by a few of the bark beetles. When introduced into the sapwood it clogs the water-conducting vessels and when water-flow is interfered with the tree begins to die. The external symptoms of Dutch elm disease is a wilting, and sometimes yellowing and dropping of the leaves on infested branches of the entire tree. The only known method of distinguishing between Dutch elm disease and other diseases of the elm is by laboratory tests. Thus whenever a person wishes identification of this disease a sample of the affected tree should be sent to the office which in turn will be forwarded to a government laboratory properly equipped for identification.

Now comes more about the subject of Quarantines. The acts of 1907 were amended in 1919, at the time the Department of Conservation was established. The Division of Entomology was made a part of that department and the act provided that the Department would have the power to formulate and enforce the necessary quarantine regulations subject to the approval of the Governor. In Indiana only two quarantines have been promulgated by the Division of Entomology - the first of these was the quarantine pertaining to the European corn borer which prohibited the movement of corn stalks, ears, or other parts or debris of corn, the broom corn plants, or sorghum or sudan grass, except clean shelled corn, broom corn seed and sudan grass seed and except green corn on the cob during the period of January to June first, also a few of the vegetable and pithy stem flowering plants from an area in the east which was infested with an injurious insect known as the two-generation form of the European corn borer. Indiana has an infestation of the one-generation corn borer, or in other words the corn borer which necessitates the entire period of one year to complete its life cycle. In the two-generation corn borer there are two generations completed in the period of one year. Since Indiana does not want to get an infestation of the two-generation corn borer established, the Division of Entomology thought it advisable to promulgate a quarantine prohibiting the importation of any host plants that might carry these insects into the state.

The second quarantine regulation promulgated was for the Japanese beetle. Inasmuch as there was only a small area infested with in the City of Indianapolis it was deemed advisable to place this area under quarantine and not permit any shipments of any plants without the soil being first removed from the plants or subjected to a satisfactory fumigation and that no soil could be removed from that area. This was done to protect the surrounding territory as well as other sections of the City and State from Japanese beetle except those that might come in by natural flight.

So it is with any other new or not widely disseminated insects or diseases which may become established in Indiana. The area found

infested or infected could be quarantined and the regulation of movement be stringently enforced. This is done primarily for the protection of those in the adjoining areas and in an endeavor to eradicate or hold in check disease or insect pests before they get beyond control or until a better method is prepared to cope with their ravages.

At the beginning of this lecture it was mentioned that a source of revenue was derived from fees from agents and dealers in nursery stock. To dwell on this a little further; The acts of 1907 were amended in 1915, classifying those who handle nursery stock but who do not grow it and enabling the Division of Entomology to license these individuals. Section 2 of the acts of 1915, states that all Dealers within the meaning of this act located within or without the State, engaged in selling or soliciting orders for nursery stock in this State shall secure a Dealer's license by furnishing a sworn affidavit that he may buy or sell only nursery stock that has been duly inspected and certified by an official inspector and that he will maintain with the State Entomologist a list of all sources from which he secures his stock. The term Dealer shall be construed to apply to any person, whether he is a grower of nursery stock or not, who buys nursery stock for the purpose of reselling or re-shipping.

Section 3 of these same acts states that all Agents within the meaning of this act, selling nursery stock for any nurseryman or dealer located within the State or outside the State shall be required to secure and carry an Agent's license, bearing a copy of the certificate held by the principal. Said Agent's license shall be issued only by the State Entomologist and to the agent authorized by their principal or upon the request of the principal. The term Agent shall be construed and applied to any person selling nursery stock under the partial or full control of a nurseryman or of a dealer or other agents. This term shall also apply to any persons engaged with a nurseryman, dealer or agent in handling nursery stock on a cooperative basis.

Section 4 of this act states that nurserymen, dealers, agents or other persons, whose place of business is outside the State, desiring to sell or solicit orders for nursery stock in this State may upon filing a certified copy of his original State Certificate with the State Entomologist of this State obtain a license permitting such persons to sell or solicit orders for nursery stock in this State.

Section 5 states that it shall be unlawful for any person to wilfully misrepresent to any other person the grade, character, variety or quality of stock in a nursery or stock offered for sale by any nurseryman, dealer or agent, or to cause any concealment of stock from inspection or to withhold any information requested by the State Entomologist for the purpose of preventing the proper enforcement of this act. Each person selling or soliciting orders for nursery stock in this State shall, if requested, furnish the State Entomologist with copies of his order forms, contract or agreement with his customers, which are furnished for the use of agents or customers or both.

Section 6 states that the State Entomologist shall at any time have the power to revoke any certificate or license for sufficient

cause, including any violation of section 5 of this act, or non-conformity with any rule or regulation promulgated under this act. It further states that a fee of \$1.00 shall be collected by State Entomologist for each dealer's and agent's license issued either to parties or firms within the State, said fees to be deposited monthly with the State Treasurer and become a fund to aid in defraying the expenses incidental to regulating dealers and agents and inspecting nursery stock received by them, prior to or subsequent to its delivery.

To backstep a little and dwell on that section of the act which has to do with the misrepresentation of nursery stock -- The Division of Entomology is proud of the record and accomplishments which have been brought about in eliminating those agents and nurserymen who endeavor to make a living selling nursery stock which was not always true to name. When the office of the State Entomologist was first established not much could be done to control an agent or nurseryman who sold stock representing it as one variety and when it came into bearing find out that it would be something entirely different. After a period of years the legislature found it advisable to enact some legislation which would make it a misdemeanor to misrepresent nursery stock. Since this legislation was enacted the Division has been active in eliminating that class of persons who are unreliable and guilty of such illegitimate tricks. Practically all of the agents, dealers and nurserymen in Indiana today are as thoroughly reliable as can be found anywhere in the United States.

Little has been said about the Apiary Inspection, but this will be taken up in another class and at which time a whole period will be devoted to giving information about that particular phase of the work. However, that section 4 of the acts of 1909, which amended the acts of 1907, states as follows: The State Entomologist shall be and is hereby constituted State Inspector of Apiaries and as such inspector it shall be his duty to aid and assist in the development and protection of the Bee and honey industry in this state, and to adopt and carry out proper methods for the suppression and prevention of contagious and infectious diseases among bees. This is all that will be said about bees at this time, leaving the rest to be taken up later.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

HONEY BEE AND APIARY INSPECTION

At first thought one may well wonder how the honey bee and a program of conservation are linked together. A little thought and study makes this clear when it is known that annually many tons of honey are lost to Hoosier beekeepers simply because there are insufficient bees to harvest the nectar borne in the flowers. The bee is our greatest conservationist, harvesting the nectar that would otherwise go to waste or dry up with the bloom and thus be forever lost to mankind. Nor is that all; aside from the value of the honey and wax produced, bees have a much greater value for the pollination work they do. This consists in carrying pollen grain from one flower to another of the same kind, causing a good set of fruit or seed.

The value of the annual honey crop in Indiana is considerable. Although the number of bee colonies may not be quite so large as it was a few years ago, due to disease, general neglect and changing conditions on the farms, the number of farmer beekeepers is greatly diminishing yet the number of commercial beemen with larger holdings employing better and more modern methods of honey production about balances with former production figures. The annual honey crop in the State varies from 3 to 8 million pounds per year, according to weather conditions or the seasons.

As has been said, although honey production in beekeeping represents a very important phase of agriculture, a much more important work of the bee is its value in the pollination of economic plants on the farm and in the garden. Competent authorities estimate that the honey bee, by aiding in bringing about more complete pollination of economic plants, returns to agriculture annually several times the value of the honey produced. The whole subject of insect pollination of plants is one of tremendous importance on which little work or experimental observation has been conducted. Enough evidence has been gathered, however, to show that in many crops, yields are greatly decreased because of a lack of pollinating insects. Among the economic plants in Indiana that are dependent upon pollination by insects, mostly the honeybee, are:

Orchard -- apples, peaches, pears, cherries, plums.

Vegetable Garden Crops -- cucumbers (grown in field and under glass), cantaloupes and muskmelons, watermelons.

Legume Seed Production -- alsike clover, red clover, sweet clover, alfalfa.

Berries and Small Fruits -- raspberries, blackberries, dewberries, some varieties of strawberries and grapes.

The total cultivated acreage of all of these crops in Indiana undoubtedly runs into several hundred thousands and the average annual value of the crops produced totals millions of dollars.

THESE ECONOMIC PLANTS DEPEND ON POLLINATION
BY INSECTS

The group of economic plants which has just been listed, unlike corn, wheat and other grains, belongs to a class of plants

which produces a heavy or sticky type of pollen which cannot be naturally windblown. Because of this the only way that pollination can be brought about is by some flower-visiting insect which functions in the mechanical transfer of the pollen to the female parts of that flower or to some other flower of the same species.

NATURAL POLLINATION INSECTS

The question is often asked, can natural pollinating insects such as wild bees, flies, etc., be depended on to bring about thorough pollination? Before answering this it is necessary to discuss certain factors that have a vital influence on the number of these important insects.

Man has upset the "natural balance", not nature, by his agricultural practices and as a result has decreased greatly the number of pollinating insects. The cultivation of lands in which crop rotations are followed over a period of years restricts breeding grounds and results in an alarming scarcity of important pollinating places of insects within these areas.

Many farmers adopt the annual practice of burning over waste land, especially along fences, to destroy noxious weeds and harmful insects. This practice also destroys many beneficial insects and more than this destroys possible breeding places and hibernating quarters for these insects and for many kinds of wildlife.

When mechanical devices and chemical means are employed for the destruction of injurious insects many millions of beneficial insects are also destroyed and these are often pollinating insects.

The great scarcity of the bumblebees is an example which is apparent to the average person. This has been brought about by the agricultural practices mentioned above and also by the wilful destruction of nests when found by man. The bumblebee is a large conspicuous insect, which explains the reason why people realize more fully the decreasing number of bumblebees. It is quite probable that there has been a corresponding decrease in the number of other smaller and less conspicuous pollinating insects.

The tendency toward specialization in the production of some one commercial crop, such as orchards and large melon and cucumber areas such as are found in Indiana, is another factor bearing on this important subject. Perhaps the best example of this is the production of fruit on a commercial basis. In commercial orchards there are large blocks of land consisting of many acres. Because of the poisonous sprays used to control injurious insects together with the fact that many orchardists practice clean culture which eliminates breeding grounds, beneficial insects are also scarce.

Whenever a large area is devoted to the production of one crop it is apparent that natural pollinating insects are too few in number to bring about the pollination necessary for the most profitable crop. When crops are grown in small areas which are bordered by much uncultivated and waste land, the number of natural pollinating insects would probably be sufficient to bring about proper pollination. However, it would not be safe always to assume that in such a condition there would be sufficient pollinating insects. There are many facts that determine the

abundance and distribution of insects, such as climate, type, fertility and drainage of the soil.

In early spring the number of natural pollinating insects is very limited due to the high rate of mortality during the winter period. Because of adverse weather conditions during that period of the year the death rate of natural pollinating insects ranges from 80 to 95 per cent. Thus it can be seen that during the spring period, when a large acreage of economic plants come into bloom which are dependent upon insects for pollination, a very serious problem arises. We believe that this problem can be solved only by large colonies of over-wintered bees or populous colonies of package bees shipped in from the South at the time most needed and transported to the place where needed.

FACTORS THAT MAKE THE HONEYBEE ESPECIALLY ADAPTED FOR POLLINATION

Because of the peculiar type of social organization of honeybees it is possible for the colony to withstand the rigors of winter and come through in the spring with several thousands of workers and the queen bee. In all other social groups of pollinating insects, the workers die in late fall and only the queen winters over. In the spring these queens or females have to build their nests and provide for them. This means that a great deal of time is spent in these duties so in reality only a small portion of their time is spent in actual pollination.

Thus with a colony of bees in the spring it is a question of where numbers count for pollination work. The fact that a colony of bees consisting of several thousand workers and a queen are able to over-winter and build up rapidly in the spring makes the honeybee especially important as a pollinating agent during the early spring period.

The pollinating problem in large areas of plants that are dependent on pollinating insects is to have a large enough population of insects distributed evenly throughout the area to bring about complete pollination, especially when the weather conditions are adverse. Here again the honeybee surpasses other insects since the population of each colony can be completely controlled and the hives or colonies can be placed at desired locations within the area.

Honeybees considered purely as pollinating agents thus outclass all other insects as the most economical pollinating insect. The social organization of the honeybees, the comparative short life cycle, the rapidity with which they breed, together with the knowledge of conditions that may be supplied by the beekeeper to stimulate building up the population make it possible to produce honeybees many times more economically than any other pollination insect to a corresponding standard of pollinating strength and efficiency.

Another factor is the "storing instinct" in the honeybee which is very dominant. This is partly due to their peculiar social organization whereas other insects may sip to live, the bee visits flowers and sips again and again, storing its gathered nectar that unborn generations of bees may live. However, there is another factor that should be emphasized since it bears so directly on the efficiency of honeybees for pollination purposes. For centuries honeybees have been selected and bred to develop

the honey gathering instinct, so as a result, this instinct is probably many times more dominant than other insects that visit the flowers.

Honeybees are the only pollinating insects in which the storing instinct can be stimulated, which as a result increases tremendously their pollinating activity. This increased activity can be brought about by certain manipulations of the colony which are based on fundamental principles of bee behavior. The honeybee is also well fitted or adapted for distributing pollen because of the fine short hairs over its body and the pollen baskets on its legs. As it goes from flower to flower many pollen grains are brushed off and carried which results in the pollination of the plant.

Honeybees are also more industrious than other insects, working from early morning until late evening. Some species of insects work only during certain parts of the day. Another characteristic of honeybees is apparent. This is their constancy in visiting flowers of a single species on a trip. This means that a honeybee will not switch from clover blossoms to apple blooms on the same trip, or vice versa. They stick to the kind of blossom they start on until they get loaded on that trip. This is a very important characteristic since it will mean that a complete pollination in a small area or that all the flowers of a given kind will be more likely covered, some of them probably several times.

From all of these facts it can be readily understood that the most common cause for a poor set of fruit or seed is in a lack of sufficient pollination due to an insufficient number of bees or other pollinating insects at blooming time.

APIARY INSPECTION LAWS OF INDIANA

From the foregoing facts it was considered proper to protect the bee and honey industry of our State by suitable legislation. Briefly our bee laws provide for the inspection of bees to -

1. Prevent the spread of bee diseases, particularly the two most serious infectious brood diseases, viz: American Foulbrood (A.F.B.) and European Foulbrood (E.F.B.)
2. A compulsory clean-up or burning of infected materials.
3. To compel the transfer of crossed comb and box hives to removable frame hives, where disease exists.
4. To regulate the movement of shipment of bees.
5. To provide for the dissemination of information regarding bee diseases and the proper care of bees through printed matter, exhibits at fairs and otherwise.

Bee inspection in Indiana is no new thing nor is it practiced alone in Indiana. Practically every state in the union provides for this. The first bee inspection law in Indiana was passed by the General Assembly in 1909, the bill being sponsored and introduced by a beekeeper and member of the legislature from Vincennes, Knox County, after it was discovered that American Foulbrood, the most serious infectious brood disease of bees threatened to wipe out all the bees in that and several other sections of the state at that time. This disease continues to be one of the major hazards to beekeeping, but control measures and the nature of the disease and its spread are much more clearly understood by the

rank and file of beekeepers than formerly.

The first apiary law, 1909, provided for the inspection of bees by the State Entomologist, giving him or his deputies full power and authority, at his discretion, to visit and examine any apiaries for the purpose of discovering whether or not any disease might exist among bees in any part of the State.

In order to prevent or control the spread of A.F.B. and E.F.B. broad powers were delegated to the inspectors. This feature of the law still exists, although some minor changes have since been made by additions or amendments. These broad powers may be summed up in a few words, as follows:

1. The bee inspector is empowered to enter, for the performance of such duties, upon any premises where bees are kept.

2. Whenever satisfied of the existence of disease in their malignant form in any apiary it shall be his duty to order all colonies so affected, together with all hives occupied by them, and the contents of those hives and all tainted appurtenances that cannot be disinfected and that might cause the further spread of the disease to be immediately destroyed by fire under the personal supervision and care, but where said entomologist, who shall be the sole judge thereof, shall be satisfied that the disease exists in incipient stages and is being or may be treated successfully, and he shall have reason to believe that it may be entirely cured, then he may in his discretion omit to destroy or order the destruction of the colonies or hives in which the disease exists. In order to carry out the provisions of this order he is required to give to the owner, or the person in charge of the apiary, instructions as to the manner of treatment of such apiary and to see that such treatment be carried out, and should the said owner or person in charge of said apiary refuse or fail to carry out the said instructions to the complete eradication of the disease or the satisfaction of the State Entomologist, he shall destroy or order destroyed all such diseased colonies by fire as provided for in case of disease in its malignant form.

The original bee law also gave to the State Entomologist full power, in his discretion, to order any owner, possessor or person having charge of bees dwelling in box hives (having mere boxes without frames) in apiaries where disease exists, to transfer such bees to movable frame hives within a specified time and in default of such transfer he shall order destroyed or destroy all such box hives and the bees dwelling therein.

It also provided for a virtual quarantine of any apiary where disease exists; in the words of the law any owner of any apiary where disease exists or any person or persons, company or corporation who shall sell, barter or give away or import into this State any colony or colonies of bees or appliances infected with disease or exposed to the danger of other bees, any comb, honey, bee hives or appliances infected with disease, or conceal the fact that disease exists among his or their bees when disease is known to exist, or refuses to allow the State Entomologist to inspect or treat any apiary or appliances, or shall resist, hinder or impede him in any way in the discharge of duties under the provisions of this act, shall be guilty of a misdemeanor and upon conviction shall be fined in any sum not less than \$10.00 nor

more than \$25.00.

The original law also stated that every beekeeper or other person who is aware of the existence of foulbrood or other infectious or contagious diseases in his own apiary, or elsewhere, shall immediately notify the State Entomologist of the existence of such disease, and in default of so doing shall be guilty of a misdemeanor and upon conviction shall be fined in any sum not more than \$10.00.

The bee law was further strengthened by amendment in 1915. This provided that the State Entomologist is empowered to prevent the removal or transportation from any private or public place, or any area of the State which contains dangerously infected plant material of any kind, and also bees and bee appliances infected with disease for such periods and under such conditions as is in his judgment necessary in order to prevent the further spread of the infestation or infection, giving such notice thereof, either personally, by deputy or by letter, and during the existence of such order no person shall remove or ship from this area any such plant material, bees or bee appliances as are set forth in the order, except by special permit issued by the State Entomologist. It was further provided that in case the owner or person in charge of any infected or infested premises or apiary shall refuse or neglect to carry out the order issued by the State Entomologist within the period of time allowed for the performance of the work, the State Entomologist may proceed to destroy or treat the infested or infected plants or plant material, colonies of bees or bee appliances. The expense thereof shall be certified by the State Entomologist to the County Auditor of the County wherein such infested or infected premises or apiary is situated and such County Auditor shall place the amount so certified upon the tax duplicate, and such amounts shall be collected at the time and in the same manner that the State and County taxes are collected.

It was further provided that any person violating any section, rules or regulations promulgated under this act shall be guilty of a misdemeanor and upon conviction thereof shall be fined in the sum of not less than \$10.00 nor more than \$100.00 for each offense. It shall be the duty of each prosecuting attorney to whom the State Entomologist or any of his deputies shall present satisfactory evidence of violation of any provisions of this act to prosecute without delay such violations in the proper court.

One further change has been made since the original bee law has been passed. This was in 1919 when the Department of Conservation took over the duties of the various separate officials and divisions of the rights, powers and duties conferred by law upon the State Entomologist and the State Inspector of Apiaries in so far as such rights, powers and duties are not inconsistent with the provisions of this act were transferred to and conferred upon the Department of Conservation, so that the broad powers were extended to the Division of Entomology and provide and make it the duty of the Division of Entomology to enforce the laws relating to horticulture and beekeeping; to specify the means and methods to be employed for the prevention and suppression of bee diseases or pests; to formulate rules and regulations for the guidance of inspectors in making inspections and investigations; to examine

any apiaries in the State and to make rules and regulations to prevent the spread of bee diseases; to require all bees to be kept in movable frame hives; to teach beekeepers how to keep bees in the most approved manner; to hold field or other demonstrations, make exhibits at the state fair and other places and on other occasions in the State; to prepare, print, post or distribute printed matter relating to bees, beekeeping and the diseases and pests affecting same and make investigations and experiments in regard to bees, beekeeping and diseases and pests, and finally, to make all necessary rules and regulations for the enforcement of the law relating to horticulture and beekeeping and the prevention of plant diseases and pests.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

DIVISION OF ENGINEERING.

The Division of Engineering was established in May, 1921, two years after the formation of the Department of Conservation. The use of engineers from the newly formed State Highway Commission, from Purdue University, and, of Consulting Engineers and members of their staff did not prove satisfactory as there was no means of integrating their activities.

The State Engineer, who is the nominal head of the Division has this title by virtue of his position as head of the School of Civil Engineering of Purdue University. This is in accordance with an agreement between the original Conservation Commission and Purdue University, entered into when the division was formed in 1921. The statute forming the division does not specifically mention such an agreement.

The Assistant State Engineer is in active charge of all activities of the division, whether they be those established by statute or those relating to cooperation with, and engineering service for, the other five divisions of the department.

The present staff, paid by state funds, consists of two Field Engineers, in addition to the Assistant State Engineer. The one Field Engineer is charged with the supervision of water supply and sanitation in regard to both maintenance and construction, in all conservation properties. In addition, he assists in the field supervision of other projects. The Assistant State Engineer and the above mentioned Field Engineer, are in direct charge of field and office supervision of all engineering planning, construction and maintenance in the Conservation Department's forty properties. The second Field Engineer handles the details of the purchasing machinery of the department. He prepares invitations for bids, specifications, tabulation of bids and purchase orders and all other paper work connected with state purchases. In addition, he assists in supervision of office planning and personnel and establishes the contact between the Conservation Department and all the relief projects (Works Progress Administration) sponsored or operated by it. His direct contact is with the state headquarters of the W.P.A., as well as the district offices, when the occasion demands. He has very few traveling duties, due to the nature of his duties in connection with purchasing.

Operating funds for the Division are furnished as an annual apportionment from the general fund of the Conservation Department and are allocated by the Commissioner according to the needs of the Division, so that it may adequately supervise the Department's planning and construction program.

The work of the Division naturally falls under two classifications; namely, drainage and land reclamation and engineering service. The former work is specifically set forth in the act creating the division, and considerable detail is given regarding these duties. The work under "Engineering Service" is allocated to the various divisions of the Department and consists of planning and executing engineering works, making surveys, maps

investigations, reports, graphs and similar work. These two general classifications are grouped in more detail as follows:

1. DRAINAGE AND LAND RECLAMATION.

1. Collection and dissemination of data and statistics.
2. Legislative recommendations.
3. Special investigations and reports on drainage and levee projects.
4. Advisory consultation.

11. ENGINEERING SERVICE.

1. State parks, memorials, reservations, preserves and fish hatcheries.
 - a. Surveys, design, construction.
 - b. Supervision of ECW design and construction.
2. Lakes.
 - a. Lake levels and surveys.
3. Special surveys, investigations and miscellaneous work.

1. DRAINAGE AND LAND RECLAMATION

The Division is empowered by statute to make investigations of drainage and flood control projects, to compile and disseminate information which may be used in planning such works, to recommend and secure enforcement of laws pertaining to such works, to assist in design of such works by measuring or computing flows in natural or artificial channels, to collect such data or information as may be necessary to any particular project, to assist drainage or levee commissioners, as they may desire, in the inspection of lands under consideration, to assist courts in an advisory capacity and to cooperate with superintendents of construction in matters on which advice is sought.

Collection and Dissemination of Data and Statistics.

In its conduct of investigations and other works, the division is constantly on the lookout for general information of both technical and non-technical nature that relates to drainage and flood protection work as well as other phases of reclamation work. In addition to the above, the division is directing its efforts toward the collection of specific information under three distinct headings; namely, a stream gauging program, a drainage survey of the state, and investigation of the effects of drainage in definite areas of the state.

Stream Gauging.

In the development of the agricultural and commercial resources of the state; it is important that accurate information be available concerning the flow in the various streams of the state. Such data are used in the planning of drainage and reclamation works, in the design of water power, water supply and sewage disposal works, in the study and correction of stream pollution, and in the adequate and safe design of flood control and protection works.

During the past seven years, this program was furthered through the operation of thirty-five gauging stations by the United States Geological Survey. These stations were operated through a cooperative agreement whereby half the expense was borne by the Department of Public Works and the other half by the above federal agency. The United States Geological Survey has a district office in Indianapolis, where flow data on Indiana streams may be secured.

Drainage Survey.

A state drainage survey was started soon after the formation of the division. Three engineers were engaged in a state-wide survey of conditions by individual counties. All persons interested in drainage were interviewed--lawyers, engineers, contractors, land owners, sportsmen, et cetera, and their reactions recorded. County records were consulted. From this mass of information, county drainage maps to the scale of 1 inch equals 1 mile were compiled for each county of the state. Copies of the interviews were compiled and filed. This material was to be used in compiling a model drainage law for the state to take the place of the heterogeneous mass of drainage laws now in the statute books. However, public sentiment has never favored such a law.

There has been an active demand for the blueprint copies of the various county drainage maps that have been compiled, which has justified the belief of the originators of the survey that there was a real need for reliable drainage maps.

Investigations and Reports on Drainage and Levee Projects.

The statute provides that the Department of Conservation, upon the written request of the court having jurisdiction, the drainage commissioner, the superintendent of construction, or any petitioner or landowner who may be affected by the proposed work, or upon its own initiative may direct the state engineer or his authorized agent to investigate any proposed drainage or levee project and make known his findings. As a usual thing, the assistance of the division has not been sought until all surveys and plans for the projects have been completed and the report filed. The division can render a more valuable assistance if consulted at the time the petition is filed, thereby giving it an opportunity to advise with the engineer, drainage commissioner and attorney during the progress of the survey, location and preparation of the specifications. In many cases, it has been found that approval could have been given a project provided certain changes in the plans or specifications had been made. After the final report has been filed, changes are difficult to make, and in such cases, the division has been forced to withhold its approval.

Advisory Consultation.

The assistance of the Division of Engineering in an advisory capacity on drainage projects is provided by law. In connection

with the proper location, design and establishment of drainage or levee systems, the division will endeavor to render every possible service when its aid is requested. However, this does not mean that the division will make the necessary surveys and prepare the plans and specifications required, but that it will advise the landowners, engineers or attorneys as to the location and design of ditches and levees, methods of construction and other points of a like nature upon which the advice and assistance of the division may be desired.

11. ENGINEERING SERVICE.

Engineering service, while not specifically set forth in the statute, is inferred. The major portion of the work of the division consists of engineering service for the other divisions of the Department. To administer the Division of Engineering, a force of engineers is provided as noted in the following paragraphs. It will be noted that the arrangement is elastic and may be expanded or contracted to suit the needs. Before the emergency relief work started, twelve engineers were employed in the division. As the relief program advanced, these men were absorbed by cooperating federal agencies, but used in the same type of work for the Department.

The office and drafting room personnel of the Division consists of a W.P.A. planning section and a planning and supervisory personnel recruited from the E.C.W. technical personnel, both from park and forest camps. The total operating from the Indianapolis office now (March, 1937) consists of ten civil engineers, two mechanical engineers, six architects and two architectural draftsmen, a total of twenty. In addition, two stenographers are employed, one in connection with purchasing and the other with correspondence and reports.

In the field, the Division of Engineering is represented in each C.C.C. camp, doing work on Conservation property, by a civil engineer. These engineers are federal employees under direct state supervision. 17 civil engineers are employed in this manner. In addition, 10 of the camp superintendents are civil engineers because of the nature of the work.

The engineering service rendered to the various divisions of the department may be classified under the following general headings, namely, water supply, sanitation, surveys and maps, power lines and cables, communication facilities, building design and construction, roads, trails and bridges, recreational areas, service areas, water conservation, supervision of maintenance and fish hatcheries. All these classifications of work are important but it is our feeling that the first two--water supply and sanitation--are of paramount importance and deserve special attention. Accordingly, these subjects are given a place of importance.

In State Parks and State Forests, where great numbers of people congregate to picnic and camp, sanitation becomes an important factor in the preservation of public health. To assist in this work, the Department has adopted the policy of modernizing the sanitary facilities at these land holdings. This work has been facilitated by the labor and materials furnished by the E.C.W. program now well under way in conservation properties.

In State Parks, practically all of the pit latrines formerly used in service areas, picnic grounds, camp grounds and group camps, have been replaced by comfort stations equipped with water borne toilets. Sewage from these stations is given primary treatment by Imhoff or ordinary septic tanks and secondary treatment by tile fields, sprinkling filters, or trickling filters.

In many comfort stations which serve camp grounds, laundry tubs have been provided. Shower baths are also provided. Naturally, the operation and maintenance of these facilities costs more but it is felt that the additional attendance gained by the addition of these conveniences will more than pay these costs.

The addition of the above facilities, together with the increased attendance, naturally increases the use of water. Using facilities provided by the Emergency Conservation Work Camps on conservation properties water supply and distribution facilities have been expanded to adequately provide water for comfort stations, drinking fountains and hotels that are now built or may be provided in the next ten years.

Some properties of the Department are located in waste lands in which the provision of an adequate public water supply from wells is a practical impossibility. In State Parks where the use of water is greater than in other properties, this problem has been solved in several different ways. At Turkey Run, a gravity sand filter plant was built, using raw water from Sugar Creek. At McCormick's Creek, a gravel wall well was sunk in the White River bottoms, three quarters of a mile from the service area. Water for Indiana Dunes State Park is pumped from 40 slotted screen well points sunk in the beach sand below the level of Lake Michigan and connected by a header attached to the pump. At Pokagon, a flowing well is utilized for the hotel water supply, while that for the camping and picnic grounds and boys' camp comes from an ordinary well. At Lincoln State Park, a filter plant equipped with a pressure filter takes raw water from an artificial lake. At Shakamak, a six-inch pipe line supplies the park from Jasonville's water system. In Clark County State Forest, a pressure filter plant utilizes raw water from an impounding reservoir and provides potable water for picnic areas. In other state forests, wells of varying sizes are utilized depending upon the amount of water needed for the area involved.

At Brown County State Park, an infiltration gallery provides potable drinking water. At the Brown County Game Preserve, water is furnished by cisterns provided with a sand filter, utilizing water from the building's roofs. At Jasper-Pulaski Game Preserve, a well point system of three slotted points furnishes water for all game farm operations, as well as for public use.

A former weak point in the Department's water supply systems has been the lack of adequate storage facilities to take care of peak loads on week-ends. This has been remedied by the addition of storage reservoirs or capacities ranging from 20 to 40 thousand gallons.

Distribution mains have been installed from the source of supply to all areas which the public is to use. This insures potable water from a central source which can be checked periodically for purity. Having a single source of water for each land unit makes chlorination a simple matter and uses only one chlorinator, thereby cutting the cost.

Two sprinkling systems have been installed. These are the pop-up type and use untreated water from a natural and an artificial lake. This water is pumped directly to the sprinklers by motor driven centrifugal pumps.

One of the first requirements in the development of an area, almost regardless of its use, is the development of a road system to serve the area. Of course, the road net or system needed for a fish hatchery, such as Bass Lake, is far removed from that needed for a state for st similar to that at Morgan-Monroe State Forest. As a usual thing, one main road is advantageously located and constructed, with minor roads or fire trails leading to those areas needing forest fire protection. In parks, the main road or drive is located so that it returns to its starting point, completing a circuit. Smaller areas are served by small drives or turnouts. In some cases stub roads are run to an isolated area which may be desirable as a picnicking or camping ground. In game farms, the roads are principally designed for service and for fire protection. However, the road connecting the facilities is usually used by visitors interested in the operation of the farm.

In the planning or layout of an area such as a forest, park or game preserve, which is more or less dedicated to public use, it is necessary to provide space to accomodate visitors so that there will be no interference with the usual work at the property. Such space is known as a service area and may be large or rather small in accordance with the type of the property. As examples, we shall take a fish hatchery, a game farm, a state forest and a state park. In a fish hatchery, service is limited to the provision of an adequate sized parking area, pure drinking water and a comfort station. At game farms, parking areas, grounds and facilities, including shelter houses are provided. At state forests, practically the same facilities are furnished for the public, except that the fire towers are available to the public with proper safety control measures. At none of the above properties is there any provision made for the camper or trailer tourist. This is due to the cost of operation of these facilities as men are required for policing and operating the necessary utilities.

In state parks, every conceivable facility that has enough demand to warrant the expenditure, is provided. It takes very little more in personnel to handle all facilities since many men are required for park maintenance. At state parks, the service area includes adequate parking spaces, picnic grounds, camp ground, recreational areas, hotel and cabin facilities, and service parking areas. All these facilities are heavily used. As mentioned, water supply and sanitary facilities are provided at each of the above areas. Service buildings and custodians' residences are also provided. All general repair work is handled in this service building during the winter months. All tools and trucks are stored and serviced here

throughout the year. No elaborate machine shops are maintained. However, a forge, anvil, drill press and other simple tools for making repairs are provided. In many of the state parks, stables have been built for the housing of riding horses.

Plans for all these service areas and facilities are compiled by the Division of Engineering, working with the division controlling the land. In practically all cases, areas are subject to expansion and room has been provided when possible for such expansion of facilities.

One phase of park service areas which needs special consideration is that of recreational areas such as playgrounds, swimming pools, beaches, picnic, camping grounds, and trailer parks. The three former types of area are strictly recreational in nature while there might be some question about the last three. At least, these are areas of minor service.

The design of a swimming pool so that proper control may be exercised over the purity of the water, and the control and safeguarding of the attendance is a complicated procedure. The size necessary for the locality must first be determined. The type of pool and probable attendance must next be decided. Upon these two considerations rests the degree of purity to strive for in the treatment of the water. This is done by recirculation filtration and chlorination in the two pools which we have designed and built. Electrically operated centrifugal pumps, pressure filters and gas-type chlorinators are used. The two pools are operated on the basis of a complete turnover of the pool water in 8 hours and 12 hours, respectively, for those in Brown County and McCormick's Creek State Parks. This length of time or turnover is based on probable number of persons who might use the pool during a twenty-four hour period.

Carrying the sub-division still further, the service area may be divided as to buildings, in addition to recreational facilities. In each type of land holding, such as game farms, forests, etc., the type of buildings and their method of construction vary according to use. In the design of these buildings, the prime need is to make each as useful as possible. It is not necessary to sacrifice appearance, however, to gain utility. Several architects are carried on the engineering staff to handle these problems in connection with the construction being done by E.C.W. Camps and the W.F.A. organization. In planning the service area, careful attention is given to proper location with reference to one another so that the utmost efficiency may be gained in the work being done, whether it be at a park, forest, game farm or fish hatchery. As the latest developments are brought forth, the interiors of buildings are rearranged to suit the needs. As a usual thing, rough ashlar stone and rough sawed or hand hewed wood is used in construction. In many cases, common brick and tile produced at the Indiana State Farm are utilized to comply with state laws concerning these materials. Very nice effects have been achieved at many of the state park hotels and hatchery and game farm service buildings.

In several buildings, a poor appearance was secured by a combination of poor design and poor workmanship, but these are

exceptional. When traveling in other states, and inspecting buildings used for kindred purposes, it was found that Indiana's Conservation buildings are, in general, far superior, both as to arrangement and appearance.

In practically every operation in our 40 properties, electrical energy is used. The problem is to arrange these operations so that transformers may be advantageously located and so that the power lines may be of sufficient size to care for the planned load as well as any likely overload. Every effort is made to make power lines and poles as inconspicuous as possible and hide them whenever possible on state park properties. At the Indiana Dunes State Park, all power lines in the beach area are carried in underground conduit.

In like manner, telephone lines are located so that they may be inconspicuous or hidden. In some cases, they are carried in underground conduit. In other cases, especially in state parks, they are located on former county or township roads which were abandoned when the park was established.

In most cases, the utility constructs the lines to our specifications--the division concerned reimbursing the utility over a 5 to 10 year period. Special arrangements are sometimes made for 3 to 6 month connections so that money may be saved on service charges.

Due to the nature of the lands in many properties, water for wildlife and recreational facilities is very scarce. In the last few years, much attention has been given to water conservation. This has largely been accomplished by the construction of earth dams with simple effective spillways to handle ordinary overflow and flood flows. The waters impounded in lakes or reservoirs vary in size from 2 to 160 acres in area. The aggregate area is 637 acres to date with about 500 acres of marsh area additional at the Jasper-Pulaski Game Preserve. Still other areas are being planned. During the recent drought periods, these impounded waters proved to be of great benefit in keeping wildlife from perishing.

Design and construction of the dams forming these reservoirs has been another recent activity of the Division of Engineering. The dam design now used was evolved from some experience in this work in Brown County Game Preserve, Clark County State Forest and Shakamak State Park in 1928 to 1930. These designs, together with the experience of a number of civil engineers in similar work in California were used as a basis for present designs. The drop inlet spillways were evolved in Wisconsin from practice and experiment in soil saving dams and university laboratories.

In the construction of these dams, great care is used in the selection of materials. Only clays having certain characteristics as to sizing and plasticity are used in the impervious upstream third. Material of a poorer quality is used in the downstream two-thirds. A cut-off trench dug to clay, rock or other material which will not let water seep through, is back-filled with the same water-tight clay used in the upstream third. The clay materials are selected by the engineer, assisted by a geologist from the Division of Geology.

Of primary importance is the location of the dam. Many possible sites must be inspected and the best tested for depth

to rock or shale. The borrow pit must also be selected within reasonable hauling distance and the materials to be used in the dam tested.

The engineers also test fish hatchery sites as to suitability for hatchery ponds and survey the water supply. The hatchery plans are prepared in our offices. These include the layout of the hatchery, cross-sections of levees, layout and details of water supply piping; drain lines, tip pipes, collectors, or seining sumps, display ponds, hatchery water supply, service buildings, holding tanks, boat houses and superintendent's residence.

Another important function of the Engineering personnel is the supervision of maintenance on roads, drives, fire trails, buildings, heavy equipment (except automotive), earth and concrete dams, bridges, trestles and other construction features. Estimates and plans (where necessary) are prepared for needed work to assist in budgeting the funds for the year.

Surveys and maps are essential in the development of a property. The first step in the acquisition of land is a boundary survey to show the limits within which development work is to be carried on. Topographic maps, showing relative elevations of all parts of a land property are desirable, but are not always made before development work is started. When funds are not available and a hurried map is needed for possible development or acquisition of land, aerial photographic maps are prepared, according to our specifications, by firms that can comply with these requirements.

In addition to planning and supervising construction of these various facilities on the forty conservation properties, the division is exercising the same functions with reference to two Resettlement Administration projects now under way, those at Martin County and Brown County.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

DIVISION OF FORESTRY

Following is a brief history and a word picture of the operations of the Division of Forestry:

The first legislation in Indiana in the interest of Forestry was enacted in 1899, when a Forest Reservation Law was passed with no appropriation for its administration. It was not until two years later, in 1901, that the State Board of Forestry was established. In the Bill creating this Board, the State Forest Reservation Act was added. At this time there was no "State Forester" of Indiana. The Secretary of the State Board of Forestry was the authorized Custodian of State Properties and as such administered them.

In 1903, the state bought its first forest property near Henryville, Indiana, in Clark County. This property, which at that time consisted of 2,000 acres, was called the Clark County State Forest.

In 1909, Mr. Charles C. Deam was appointed State Forester, serving in that capacity until 1926. He is still active in connection with the Division as State Research Forester. Forestry work of the Board at that time consisted mainly in the establishment of experimental plantings, the collection of data, and the publication of its work through bulletins published and distributed free of charge throughout the state. All this work was carried on at the Clark County State Forest.

In 1919 the various Boards, including that of Forestry, was consolidated into the Department of Conservation.

The next important piece of legislation was enacted in 1921, when the Land Classification Act was passed, under which the Division is now working.

The LaFuze Act passed in 1924, authorizing a 2-mill tax on real property giving the Division of Forestry funds for the purchase of additional land, thus broadening the activity.

In 1925, A Clarke-McNary nursery was established at the Clark County State Forest at Henryville. You will hear more detailed information regarding the Clarke-McNary Law later.

In 1927 power was given to the Division to detect and suppress fires on private land, using money from the Forestry fund. In addition to this fund, the Clarke-McNary Fire Law, which was approved by the State Legislation in 1929, brought Federal funds to be used for the same purpose.

The next important step and possibly one of the most influential in the history of forestry in Indiana, was the Emergency Conservation Work program which was established in 1933.

DIVISION ADMINISTRATION

This brief history takes us to the present activities and duties of the Division.

This chart has been prepared for the purpose of giving a clearer understanding of these activities and duties, and will be the basis for this talk.

The State Forester is the Administrative Head of the Division and is aided by the Assistant State Forester.

At this point in the consideration of the history of the Division, the cooperation with the different Federal Agencies is of great importance.

FEDERAL COOPERATING AGENCIES U. S. Forest Service

Among the cooperating Federal Agencies and possibly the first in importance, is the United States Forest Service which has established a purchase unit of approximately 800,000 acres in Southern Indiana. With the many problems which naturally come up in the administration of such an extensive area, it is necessary that the State and the Forest Service maintain close contact.

The Forest Service administers the distribution of all Clarke-McNary funds, which, along with State funds, are used in the operations of the nurseries and fire protection system.

Soil Conservation Service

Another Agency which cooperates is the Soil Conservation Service with headquarters at Bedford. Their work consists mainly in teaching by demonstration the proper methods of soil conservation on privately-owned farms. Cooperation with this Agency is desired since the permanent woodlot is a definite part of their program and a primary phase of the State's work.

Resettlement Administration

The Resettlement Administration is now using Federal funds to acquire approximately 50,000 acres of land in two units; one in Brown County and the other in Martin, all of which will be eventually turned over to the State to be administered as State Forests. They are now developing the property through the erection of a complete set of buildings and fire towers, and by the construction of water lines, sewage systems, roads, etc. The Division is particularly interested in this phase of their work. Other activities of that Agency are (1) Rural Rehabilitation (2) Land Use (3) Rural Resettlement.

(1) Under Rural Rehabilitation comes (a) short-time loans to qualified farmers who need credit aid to continue their farming operations. The maximum time is five years and interest rate five percent. Emergency loans also are offered for purchase of feed. Cash grants are made in a limited number of cases to farm families in need of funds for purchase of food. (b) Cooperative loans are made to farm groups for the purchase of equipment or services which members of the group could not economically purchase and use as individuals. (c) Cooperation with voluntary state and county Farm Debt Adjustment Committees in assisting farmers and creditors to work out equitable debt adjustments is a fourth function under Rural Rehabilitation.

(2) The Land Use Division makes plans, acquires land and handles developments for transferring non-agricultural land from farming to more economic uses such as reforestation, erosion control, water conservation, flood control, game preservation and recreation. Projects are sponsored by some other agency. In Indiana, Martin and Brown County projects are sponsored by this Division.

(3) The Rural Resettlement Division makes plans, acquires land and builds improvements for good quality homesteads to be occupied by qualified farm families now living on land too poor to afford a decent standard of living. These homesteads will be sold to selected occupants under terms of long-time mortgages. It is expected that most of the occupants selected will be those who voluntarily sold their land in the poorer areas to the Resettlement Administration for Land Use developments. (b) This division also is handling a few suburban homestead projects originally started by the Subsistence Homesteads Corporation.

Central States Forest Experiment Station

The Central States Forest Experiment Station conducts experiments in connection with our various state forest activities. They have a group of buildings at our Morgan-Monroe State Forest which are used as a laboratory and as housing facilities for their personnel.

Agricultural Conservation Program

The Agricultural Conservation Program is administered in a large part through the land grant colleges and their county agricultural agents through the state. This Agency reimburses the farmers in cash, in return for which they plant soil building crops, permanent cover crops, and permanent forest cover, the last being the particular part of their program in which we are interested. The Division of Forestry, cooperating with other State and Federal Agencies, has established certain requirements by which the farmer must abide to receive his payment for trees planted.

Emergency Conservation Work (ECW - CCC)

The last Federal Agency is the Emergency Conservation Work which is better known as the Civilian Conservation Corps Program. You will hear more later regarding this Agency. The State Forester serves as the Director of ECW in Indiana in the administration of the work program of the ECW camps located on state forests and state game preserves.

State Cooperating Agencies State Colleges

Close cooperation is maintained with Purdue University. The Agricultural Experiment Station and the Extension Forester are located at Purdue, the latter position being maintained by the Division of Forestry, Purdue University and the Federal Government. The Division of Forestry cooperates with the Extension Forester in the development of better forestry practices as related to the farm. In addition to his work with the Agricultural Experiment Station, the Extension Forester fosters forest classification in the purely agricultural areas of the state.

State Planning Board

The State Planning Board, a third state division with which the Division of Forestry cooperates, is composed of a group of men dealing with Land Use. This Division plays the part of an advisor regarding the forestry problems with which they deal.

PROTECTION OF FOREST LAND

The Division of Forestry is held responsible by the Federal Government for fire protection of the state forest land which consists of 5,000,000 acres. This function was brought about by the enactment of the Federal Clarke-McNary Act in 1921, which provides money to the various states having forest land needing protection.

At the present time there are two district foresters in charge of the fire protection program under the supervision of the State Forester. The state is divided into three distinct protection districts; the southwestern, southeastern and northern districts. One of the district foresters has his permanent headquarters in the southeastern district and the other in the southwestern district, while the northern district is handled by both.

The protection of forests from fire is of paramount importance to all phases of conservation activity. To enlarge on this particular subject, why not consider its relation to the propagation of Wild Life? The State of Indiana raises and distributes millions of fish, game birds and animals yearly for restocking purposes. This requires a great deal of effort as well as the expenditure of considerable funds. Since game will not live on burned-over land, a natural home protected from forest fires must be provided. It is common knowledge that wood ashes from burned-over areas washes into the streams, forming a pure lye solution which causes the death of countless numbers of fish. The destruction of humus and ground cover because of a forest fire permits rains to wash and erode the soil, resulting in the silting of stream beds which destroys the spawning grounds of fish.

The aesthetic or scenic value of forest lands must also be considered. If marred by areas of charred stumps, fallen and burned snags which were once trees, a general scene of havoc and devastation results. As an example, suppose one of the State Parks were completely burned over. How many visitors do you think would then enjoy it? From such an example you can see that this particular function of the Division of Forestry is one of common concern. This subject will be taken up in full later by one of the district foresters.

Under forest protection also comes the control of forest insects and diseases. This Division works in close contact with the Division of Entomology in this regard.

FOREST RESEARCH

Since Forestry is a science which must progress to meet the needs of man, the subject of Forest Research is one of great importance. The practice of Forestry is confined geographically to locations having definite forest regions in which different types of forest growth occur naturally. It is necessary therefore that definite and scientific knowledge be obtained as to how these types can be put to use for the betterment of society. In other words, a forest in Indiana cannot be managed in the same manner as one in Michigan. Each state must establish its own working principles. Therefore Forest Research is a nucleus from which forest practices are developed. In this field, as a Division, the concern is with fire control, experimental plantings, disease and insects.

FOREST UTILIZATION

Hand in hand with research comes the principles of forest utilization. Raw materials of the forest must be used wisely in order that the economic good can be realized by all concerned. This important function of the Division is one that has not to date been as fully developed as it should be, because of a lack of funds and personnel. Forest Utilization is (1) the dissemination of knowledge of existing uses to which raw materials of the forest can be employed (2) the development of new uses for these same raw materials (3) the combating of wood substitutions, and (4) the furtherance of the elimination of wasteful

practices which now exist in the lumber industry. The work along these lines to date by the Division has consisted largely in surveys of (1) the woods used by Indiana industries (2) the production of wood products and (3) the sources of supply of these woods now existing within the state.

FOREST EXPERIMENTATION

Inasmuch as the science of forestry is a long-time program, a great amount of experimentation is necessary. You can readily see that State ownership of large tracts of land set aside as practical laboratories and timber reserves known as State Forests, is a primary requisite. Hence, it is necessary that the acquisition of these lands be one of the most important functions.

ACQUISITION OF LAND

To give some conception of the amount of work required in the purchase of land for state forests, "acquisition" is divided into two main headings; surveys, and legal procedure. Naturally the owner of the land is desirous of getting as much as possible for his land. Therefore it is necessary that detailed surveys be made to arrive at a fair price in the interest of both the State and the owner. Since this land will be used for various activities such as experiments, forest plantings, and recreation, it is necessary that it be of a certain type, preferably forested. Four types of surveys are made (1) a topographical survey showing the various elevations (2) a soil survey showing the different types of soil, which is essential to the establishment of plantings and nurseries (3) a boundary survey, and (4) a type survey dealing with different kinds of vegetation on the land. If there is much timber concerned in the purchase, the owner is furnished with an estimate of that also.

After these different surveys have been studied and digested, the land is appraised. If the proposed price is satisfactory to the owner, legal procedure begins.

Due to the strict legal requirements under which state land purchases are made and legal title is assured, the actual purchase is often a long drawn-out procedure. A complete abstract of the land dating back to the time of Government ownership, which must be made entails a large amount of labor. Ofttimes titles cannot be shown clearly from one owner to another. In such cases the assistance of the court is required to clear title.

EDUCATION

Since it is true that "without favorable public sentiment no projected program can long endure", it is necessary that knowledge of all activities be made public.

The education of the landowner regarding proper forest practices is a very important divisional function. This education is furthered (1) through the publication of free bulletins on tree planting and forest fire control (2) by supplying speakers and motion pictures to Agencies such as 4-H clubs, conservation clubs, county Farm Bureau gatherings, civic organizations and schools.

Aside from the information and entertainment provided by the educational program, the conscientious forest landowner really wants to know how to intelligently manage his land so as to enable him to receive its fullest benefits.

Silviculture

This leads to the principles of silviculture, with which the trained forester must deal. In this particular field, the Division acts as a consulting Agency. In other words, the staff of foresters are often called upon to help forest landowners determine the correct method or methods which should be used in the management of his woods.

Silviculture is the science or knowledge which enables the forester to deal with the problems of trees as a group. From this definition you can see that it is an inexact science about which much is yet to be learned and to do so it is necessary to establish experimental plots where different types of stands are managed for indefinite periods of time for the purpose of securing working knowledge which can be passed on to the private owner. There must also be nurseries from which to supply stock for the reforestation of denuded areas. What, when and where to plant are problems to be dealt with. To gain the best results, each type of soil requires certain species of trees. The exposure of a plot of land has considerable bearing on the determination of species best suited to the site.

Silviculture also deals with the different types of cutting required in the management of a woods. This cannot be discussed here except to say that they are necessary in the proper management of woods and to some degree are determined by the product desired.

To set an example to the landowners who are cooperating in proper land use, it is necessary to establish the correct procedure to follow in the management of individual forests and forest lands.

The subject of forest management is one which entails many diversive problems. For instance, a forest may be managed (1) for the recreation it provides (2) solely for its timber products (3) for the wild life it protects and (4) in many instances for water conservation and the protection of water shed.

Erosion

Erosion control presents another problem. In these instances the land is usually badly washed and so depleted that it is necessary to select trees capable of existing on the poorest types of soil. In some cases the land is so badly eroded that it is necessary to plant lespedeza, rye, or some other form of grass in addition to trees.

Forest Management - State Forests

The new school of thought in Forest Management, however, is that of multiple-use which is being used by the Division of Forestry in the management of its own forest properties. In other words, State Forests are used at the present time for the combined purposes of (1) timber production (2) wild life refuge (3) recreation (4) education (5) research (6) water conservation and (7) fire prevention, which altogether constitutes a demonstration area to which the public can look as the criteria of proper Forest Management.

Classification

This same thought is carried to cooperators who have land classified under the Forest Classification Law, which will be discussed later in full by one of

the District Foresters.

Construction (Forest Management)

To reach the desired objective in the proper management of State Forests, it is necessary to construct roads, buildings, firebreaks, bridges, dams, plantations, sewage disposal plants, recreational areas, water systems, telephone lines, fire towers, and power systems.

Sustained Yield

"Sustained Yield in connection with Forest Management, has for its objectives (1) annual timber crops of approximately equal size (2) maintenance of stable industrial communities furnishing permanent employment, wages and purchasing power, and (3) attainment of full use of the productive capacity of forest lands.

The conception is an industrial community composed of various wood conversion factories with trade and social facilities permanently supported in a large part by the raw material supplied from a tributary forest area. This forest area may not necessarily be contiguous to the manufacturing plants, and the products of several sustained yield units conceivably may contribute to the wood conversion center.

"From a technical point of view the forest property with its basic natural resources may be regarded as the indispensable requisite of a sustained yield unit, but the raw material originating there cannot be converted into useful products without the application of labor. It is the assurance of a constant supply of raw material and security in the employment of labor which lead to permanence of manufacturing development, and the two together insure the opportunity for social facilities deemed essential for human contentment.

"There are three general requirements for sustained yield: (1) stable ownership of forest land (2) unified control of the property and (3) scientific management of all important biologic, commercial, and social processes.

"Numerous potential sustained yield units are prevented from becoming so managed because of the multiplicity of land owners whose diverse interests prevent them from agreeing upon a logical and permanent policy for the whole unit. This condition is aggravated by ownership arrangements which are fundamentally unsuitable for the business of stable and permanent management. These, coupled with burdensome carrying charges, result in recurring shifts of ownership which are incompatible with sustained yield plans.

"A sustained yield unit is a complex biologic and social entity. Scientific control is essential to continuous productive management of such an entity. The technical problem upon the solution of which sustained yield, as broadly defined above, is contingent, comprises (1) those processes pertaining to the growing of forest crops and to other forest land uses (2) those concerned with the utilization of forest products, and (3) those relating to social conditions. Wise management of all these processes is vital to successful attainment of the objective sought.

The silvicultural operations necessary for maximum yields will maintain forest covers and insure perpetuation of forest influences upon streamflow and control of erosion. Sustained yield furnishes an opportunity for removing forest lands from submarginal agricultural operations and putting them to profitable use. Stable tax bases furnished by continuously productive sustained yield

units and permanent industrial communities are the antitheses of diminishing returns and poverty stricken counties. In addition, predictable yields going to market through known centers of manufacture furnish fixed bases for long-time social and industrial planning."

EMERGENCY CONSERVATION WORK PROGRAM (CCC)

At the time President Roosevelt took office, there were 13,000,000 people unemployed in the United States, of which (at a conservative estimate) 3,000,000 were men and boys between the ages of 17 and 25. To help relieve this situation the Emergency Conservation Work Program was enacted by the 73rd Congress, which made all men between these ages eligible for work in conservation activities. Indiana was one of the first States to submit to Washington a concise and practical program outlining the needs of conservation activities at that time. As a consequence 19 camps of 200 men each were allotted during the 1st period. In the 2nd period this was increased to 24. This number did not include the camps allotted to the Division of Lands and Waters for work in State Parks under the direction of the Department of Interior. As far as work projects are concerned, the camps were under the direct supervision of the Division of Forestry. However, in April 1934, the camps undertaking private erosion work were turned over to the Soil Conservation Service under the provisions of the Soil Conservation Act. At present the Division of Forestry is supervising 12 camps.

A short discussion of the administration of an individual camp will give a clearer understanding of its operation. The United States Army is responsible for the housing, clothing, feeding, sanitation, and recreational activities of a camp and is represented in each location by a (1) Commanding Officer (2) Junior Commanding Officer (3) Medical Officer and (4) an Educational Advisor, who, in addition to his education activities, looks after the recreational requisities. As supervisor of the work project, the Division of Forestry is represented in each location by a (1) camp superintendent (2) civil engineer (3) graduate forester (4) construction foremen with practical training (5) mechanic and (6) blacksmith.

The State Forester was appointed by the United States Forest Service as Director of the Emergency Conservation Work in the State. Under him there necessarily had to be an acting Director and a complete administration unit. Since the work is more or less divided into two separate divisions consisting of forestry and engineering, it was necessary that an Associate Forester and an Assistant Civil Engineer be appointed. Under the direct supervision of the Director, these two men see that the work projects of the camps are carried out.

Each camp has its own definite conservation work program. For instance, work at the Jasper-Pulaski Game Preserve is devoted entirely to game propagation; at Wawasee it is devoted solely to the production of fish; while at Wells County game propagation, recreation, and research are all three emphasized. At the remainder of the camps the work program is more or less devoted to the multiple-use program.

In each camp you will find two major programs: first, operations, and second, education.

Operations

The operation activities is segregated into three definite parts (1) physical development (2) maintenance and (3) forestry activities.

(1) Under physical developments comes the construction of roads, dams, buildings, recreational areas, parking areas, fish and game refuges, and fish and game propagation.

(2) Under Maintenance comes the restoration of road surfaces, building and like facility maintenance and renewal; the care of fish and game propagation with their attendant housing and structures; the care of nurseries and fire lanes; and other numerous activities concerning the general care of properties.

(3) Under Forestry Activities, comes (a) nurseries (b) plantations and (c) fire prevention.

Plantations are sub-divided into field erosion control and game food plantings.

Fire prevention is divided into three parts; detection, prevention and suppression.

Education

Under Education comes forestry, skilled labor, engineering and vocational training.

TAKEN AS A WHOLE, The Emergency Conservation Work Program as administered by the Division of Forestry, has furthered forestry and conservation activities in Indiana in the past four years to the point of receiving commendation from all who are in a position to judge. The results accomplished in this length of time with the aid of the Emergency Conservation Work Program, would have required at least 25 to 30 years for the Division to have attained alone.

SUMMARY

The Division of Forestry cooperates with all Divisions of the Department of Conservation toward bringing about the most proper and productive land utilization possible in our State.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

EMERGENCY CONSERVATION WORK ORGANIZATION.

On March 31, 1933, Congress approved an Act for the relief of unemployment through the performance of useful public work, and for other purposes, which Act is as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of relieving the acute condition of widespread distress and unemployment now existing in the United States, and in order to provide for the restoration of the country's depleted natural resources and the advancement of an orderly program of useful public works, the President is authorized, under such rules and regulations as he may prescribe and by utilizing such existing departments or agencies as he may designate, to provide for employing citizens of the United States who are unemployed, in the construction, maintenance, and carrying on of works of a public nature in connection with the forestation of lands belonging to the United States or to the several States which are suitable for timber production, the prevention of forest fires, floods, and soil erosion, plant pest and disease control, the construction, maintenance or repair of paths, trails and fire lanes, in the National Parks and National Forests, and such other work on the public domain, National and State, and Government reservations incidental to or necessary in connection with any projects of the character enumerated as the President may determine to be desirable:

"Provided, That the President may in his discretion extend the provisions of this Act to lands owned by counties and municipalities and lands in private ownership, but only for the purpose of doing thereon such kinds of cooperative work as are now provided for by Acts of Congress in preventing and controlling forest fires and the attacks of forest tree pests and disease, and such work as is necessary in the public interest to control floods. The President is further authorized, by regulation, to provide for housing the persons so employed and for furnishing them with such subsistence, clothing, medical attendance and hospitalization, and cash allowance as may be necessary, during the period they are so employed, and in his discretion, to provide for the transportation of such persons to and from the places of employment. That in employing citizens for the purpose of this Act no discrimination shall be made on account of race, color, or creed; and no person under conviction for crime and serving sentence therefor shall be employed under the provisions of this Act. The President is further authorized to allocate funds available for the purpose of this Act, for forest research, including forest products investigations by the Forest Products Laboratory."

This Act of Congress gave President Roosevelt the authority to organize the Civilian Conservation Corps and the Emergency Conservation Work program.

The President appointed Robert Fechner as Director of Emergency Conservation Work and also appointed the following men as the advisory council:

Gen. Geo. P. Tyner	Brigadier General, General Staff; Represent- ing the War Dept. in Emer- gency Conservation Work
F. A. Silcox	Chief Forester, U. S. Forest Service, representing the Dept. of Agriculture.
Arno B. Cammerer	Director, National Park Service, representing Dept. of Interior
W. Frank Persons	Representing the Department of Labor.

Each of the four Departments which the above men represent plays an important part in the CCC and ECW.

In order to clearly show you how ECW and CCC function, it will be necessary to define a few terms frequently used and to inform you as to the functions of the various departments represented.

The term technical services so frequently used includes those in the Federal Departments of Agriculture and Interior who execute the work projects under the Act and the State agencies such as the Division of Forestry who share in the operation of the Act.

The Technical Agencies, the Army and the Department of Labor each have certain duties and functions to perform.

The Department of Labor is responsible for the selection of enrollees. A complete investigation is made of each enrollee to determine the financial condition of his family. Enrollees whose families are on the relief rolls are given first preference.

The responsibilities of the Army are:

1. Build and equip work camps at locations specified by the technical agencies.
2. Transport men to the work camps from the conditioning camps.
3. Feed the enrolled men and others quartered at the camp.
4. Provide medical attention and hospitalization and handle compensation cases of enrolled men and maintain discipline in camp.
5. Provide clothing and camp equipment, replacements as needed.
6. Pay cash allowances and all expenses incident to operation of camps, including transportation of camp supplies and camp equipment to the camps.
7. Pay all bills or vouchers properly submitted by technical service which are payable from ECW funds.

Responsibilities and duties of the technical services are:

1. Selection of camp locations with relation to the work

- to be performed.
2. Plan and direct work with exclusive authority in the field.
3. Transport the men from the work camp to the job and back, and on the job.
4. Furnish or hire the technical supervisory and facilitating personnel for the direction of the work projects.
5. Purchase equipment and materials for doing the work, except as equipment can be provided from stocks on hand, Army and other.
6. Voucher salaries of technical supervisory and facilitating personnel hired for the projects, traveling expenses of regular employees on this work, materials and equipment purchased for the work, and other expenses incidental to the work projects, for payment by Army.
7. Fix daily hours of work in emergencies such as fire fighting.
8. Turn over to the Army official in charge of the camp for suitable action men who are incompetent or insubordinate.

The Division of Forestry, which is the sponsor for forest work on both state and private lands is cooperating with the United States Forest Service and United States Department of Agriculture in the administration of 12 camps under its jurisdiction.

These camps are located as follows:

Clark County State Forest, ECW Camp S-51-A, Henryville, Ind.
 Morgan-Monroe State Forest, ECW Camp S-52, Martinsville, Ind.
 Brown County State Game Preserve, ECW Camp 53-S, Nashville
 Jackson County State Forest, ECW Camp S-55, Brownstown, Ind.
 Jasper-Pulaski State Game Preserve, ECW Camp 67-S, Medaryville, Indiana

Pike County State Forest, ECW Camp 72-S, Winslow, Indiana
 Ferdinand State Forest, ECW Camp S-76, Ferdinand, Indiana
 Harrison County State Forest, ECW Camp S-86, Corydon, Ind.
 Wawasee State Fish Hatchery, ECW Camp S-88, Cromwell, Ind.
 Wells County State Forest, ECW Camp S-93, Bluffton, Indiana
 Salamonie River State Forest, ECW Camp S-94, Lagro, Ind.

Greene County State Forest, ECW Camp S-96, Linton, Indiana

The State Forester, Mr. H. A. Woods, has been appointed State Director of ECW (for state forest camps).

The State ECW organization, which is responsible for carrying out work program as desired by the President, is as follows:

Mr. H. A. Woods, State Forester, Director; Mr. Albert Egly, Acting Director and also in charge of the fiscal department; Mr. R. G. Rossell, Assistant Architect, in charge of the designing of all buildings constructed by ECW; Mr. J. W. Quick, Assistant Civil Engineer, in charge of physical development such as roads, bridges, dams, etc; W. C. Palmer, Associate Forester, in charge of forest activities; Mr. Clinton Green, Principal Clerk, in charge of procurement; Mr. H. A. Wann, Supervising Mechanic, in charge of ECW Central Garage and of all trucks and heavy equipment; Mr. H. H. Oetting, Principal Foreman, in charge of the Central Supply Depot, and in charge of our safety program.

The present 12 camps have the following field personnel who actually carry out the program: 12 camp superintendents, 11 foresters, 13 engineers, 27 foremen, 28 skilled workers, 19 mechanics and approximately 2000 enrollees.

The work program is divided as follows: Physical development, that is, the construction of buildings, roads, dams, etc., maintenance of heavy equipment; forest activity, and education.

Physical development and maintenance will be discussed by Mr. Quick.

For many years, the prominent American citizens have urged that we use our timber supply wisely and replace our forests as they are cut. With this in view the ECW organization is attempting to work out a well-planned forestry program for Indiana, both on state and private properties.

Much of the state-owned forest land had been cut over and burned over to such an extent by private individuals before being acquired by the state that it is necessary to carry out extensive timber stand improvement cutting. Briefly, T. S. I. consists of the removal of undesirable species, poorly formed trees, defective trees and wolf trees, the latter of which occupy too much space and crowd out many of the more desirable trees. As a result of our T.S.I. work we have obtained many thousand feet of lumber and large quantities of posts and poles. Much of the wood which is unsuitable for either lumber, posts or poles is made into charcoal.

We have established excellent nurseries capable of producing yearly millions of good hardwoods and conifers. In addition we have had 12 or 13 black locust nurseries at various camps. These have produced approximately 40,000,000 seedlings for erosion control work.

The Civilian Conservation Corps under the direction of trained foresters and foremen have greatly aided in the detection, prevention and suppression of fire. All of our Civilian Conservation Corps companies are available to Mr. Yost and Mr. Beadell, District Foresters, in charge of fire protection and are at all times ready to assist these men in any of their fire problems.

A large portion of our state forests were not adequately stocked with trees. During six or eight weeks of each spring the Civilian Conservation Corps concentrates on a planting program on each state forest and are rapidly planting most of the open areas.

In addition to field planting erosion control work is carried on. This consists mainly of construction of small check dams and the planting of black locust seedlings in and a few feet back from the gullies. We have found that this procedure adequately takes care of ordinary erosion problems.

Numerous game food plantings have been made on all state forests. It is necessary to make these plantings to provide adequate food for wild animals and birds.

The educational program in the Civilian Conservation Corps camps is of great importance. Many of the enrollees have completed but a few years of schooling and at the present time are not fitted for any work other than that of a laborer. Emergency Conservation Work personnel is cooperating with the Department of Education and the Army officials in attempting to train these

boys so that they will be able to fill better positions after they leave this work. We have developed large numbers of good truck drivers, tractor drivers, grader operators, shovel operators, drag-line operators, mechanics, and carpenters.

We believe that the average enrollee after spending a year or two in the Civilian Conservation Corps will be better fitted to secure a permanent position on the outside.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

ENGINEERING AND TRANSPORTATION WORK UNDER E.C.W.

The establishment of the Emergency Conservation Works C.C.C. brought with it the problems of Engineering in all its varied forms. The 14 properties under forest and game preserve classification were undeveloped to some extent. Serviceable trails, buildings and other like facilities were needed that would not only permit the proper carrying on of the work but serve as permanent facilities for later use.

Each camp was furnished with one or more engineers to lay out and plan the improvements as well as the necessary trails and minor roads. This work was carried on with the help of CCC labor to the greatest extent possible.

Grades for trails and roads were established in accordance with forest practice with the questions of drainage and anti-erosion preventatives kept in mind. It was realized that these initial installations of trails and transportation facilities would entail future maintenance but the work was so essential to the developments that they could not be avoided. There are now approximately 146 miles of trails in the various properties, some are not necessarily public thorough-fares but are a means of ingress and egress to the more remote sections. These will take care of future development and other essential duties, such as the suppression of fire.

Early in the work program the conservation of water was considered. In the various forests water areas were created not only for its future effect on land and wildlife but as a source of supply for human needs. In all, 14 of these impounding dams have been constructed by ECW with water areas from 2 to 60 acres each and more under construction or contemplated.

Most of these conservation reservoirs are in the southern half of the state where the run-off from rains is rapid and the ground supply negligible. A noticeable increase in bird and animal life is in evidence during the few years these structures have been completed and there is no doubt that with the completion of more of these dams the State will have at least partly attained its goal.

Along with the development of reservoirs has come the creation of fish rearing ponds in regions where there was a shortage of natural ponds and small lakes.

Approximately 20 acres of hatcheries have been created exclusive of the projects at Wawasee where one of the most modern and efficient fish rearing plants is established. This plant with its operating ponds and service building as well as the attendant features of display ponds for public education is one of the outstanding accomplishments of the CCC. Along with the Federal aid in labor and material the State of Indiana contributed approximately half of the expense involved.

In state game preserves including Jasper-Pulaski, Wells County and Brown County there has been great development in wildlife facilities. Game propagation and rearing features on the most modern

kinds have been developed by E.C.W. which will greatly aid in the restocking of Indiana's forests and fields for the recreational benefit of generations to come.

With the development of the forest areas there was introduced a new feature rather peculiar to one area. In approximately 8 counties of the State, in the southwestern strip coal mining region, this operation is being carried on. The result of strip mining operations with power shovels, has left the surface of ground in these areas in a deplorable condition. The State has been able through enacted legislation and its forest program to secure these lands and develop them. Water areas are created in these holes and in one location alone these ponds for fish and recreational purposes will exceed 22 acres of canal-like ponds. Conifers and hardwoods were planted on the spoil banks which will in time beautify the area for use as a park.

Timber improvement cutting, the suppression of forest and grass fires, the education of the public in prevention of loss through fire have been some of the important roles of the CCC.

Along with the other developments has come the establishment of permanent structures for service areas for administration forces and equipment. These buildings have been constructed by CCC labor from lumber harvested from the forests in improvement cutting and from their structural and substantial design form a utility that will endure to the benefit of the State for many years. These units consist in most cases of a service building for housing equipment and supplies, a custodian's house for the administrator of the area and attendant water and sanitation facilities.

Another feature increasingly popular with the public is the establishment of recreational areas consisting of picnic grounds, parking spaces and shelter houses of various types and designs with their accessories. These buildings are of a design in keeping with forest surroundings.

The nature of the work carried on by ECW as outlined has been varied and instructive and of a substantial and lasting nature. The men who have produced these accomplishments have benefited by an educational and vocational training difficult to estimate but undoubtedly of large value to not only the development of the public properties but more definitely the work in saving and promoting human happiness and use of natural resources both for the men who performed the labor and the public.

A list of the building operations and of the CCC forestry camps is as follows:

PROJECTS	BUILT	UNDER CONSTRUCTION	TOTAL
Service Buildings	7	4	11
Custodian's Cottages	3	4	7
Barns	6	5	11
Shelter Houses	16	7	23
Lodges		1	1
Mill Buildings	1		1
Lumber storage sheds	15	2	17

Eng. & Trans. Work - ECW -3-

PROJECTS	BUILT	UNDER CONSTRUCTION	TOTAL
Rangers cabins	9		9
Forestry Bldgs. Clark Co.	6		6
Museum Bldg. Jackson Co.	1		1
Explosive Magazines	5		5
Nursery Service Bldgs.	2	1	3
Lakes and Dams	8 (130 acres)	8 (317 Acres)	16 448 Ac.
Reservoirs and filters	10 (160,000 gal)	3 (80,000 gal)	13 (240,000 G.
Water systems	14	4	18
Waste disposal systems	14	4	18
Trails	140.6	2.4	143.0
Power lines	12 miles	.75 miles	12.75
Telephone lines	16.6	2.3	18.9
Oven Shelters	7	6	13
Fire towers	14	4	18
Garages	4		4
Machinery storage sheds	4		4
Latrines	26	16	42
Bridges	16		16
Storage Sheds	9		9
Acres nursery	116	27	143
Logging and sawing oper.	13		13
Ice Houses	1	1	2
Beaver houses	1	1	2
Incubation houses	2		2
Animal shelter sheds	4		4
Animal feed sheds	2	6	8
Raccoon breeding pens	14	6	20
Quail brooder houses	46	20	66
Vermin display bldgs.	2	1	3
Animal corrals	12		12
Rearing and holding pens			
(rods of fence)	11000	3000	14000
Fish rearing ponds	17	23	40
Fish and game misc. minor bldgs.			

TEMPORARY MISCELLANEOUS BLDGS.

	Built	Under Construction	Total
Paint-shop M-M		1	1
Equipment storage		1	1
Mill Bldg. Wells Co.		1	1

The operation of the camp work required the use of motor trucks both of the stake and dump variety as well as pick-ups for use of the Superintendents and others in inspecting the work and hauling of material and supplies. Depending on the nature of the major activities at the individual camps the type of trucks in each has varied. If earth moving or surfacing of roads was underway the majority of the trucks in use were the 1½ ton dump. The transportation of men has been handled by the stake trucks also used in the transportation of materials such as lumber, etc.

As the program has progressed other heavy equipment has been acquired such as semi-trailers, tractors, graders and earth moving machinery.

It has been possible to take care of a portion of the maintenance and repair of this equipment at the camps but a central unit was necessary where heavy repairs could be made and supplies of parts be available in the quantities necessary.

This Central Supply Depot both for handling small tools and supplies and automotive and other equipment parts was located at Morgan-Monroe State Forest, a central location with respect to the camps.

Organization of the depot consisted of two divisions, one the tool and small equipment department, the other for the repair and parts operations. As the original motorized equipment acquired age expedited by heavy use and as new heavy machinery was added, the repair department was expanded by placing competent mechanics in various camps where considerable units were located or where other camps could be served readily. The central unit was also expanded by the employment of mechanics and use of CCC labor. A large garage has been acquired in the town of Martinsville for storage of parts and supplies in quantities and for repair and rebuilding of trucks.

The importance of repairs can readily be realized as it is vital to the program in all its aspects. Age of the equipment has made the work increasingly difficult. The training of enrolled men in this work has been to their benefit in an educational and vocational sense.

Generally the construction program, the surveys and engineering work, the care, use and maintenance of equipment, and the forestry work, will continue to be a source of valuable training for all enrolled men and has an educational value that is of great importance and in line with the purposes for which the Civilian Conservation Corps was established.

FALSE ALARM FIRE REPORT

District _____
 County _____
 Township _____
 T _____ R _____ Sec. _____

Date _____
 Warden's No. _____
 Towerman's fire No. _____

CAUSE OF SMOKE

Indicate Cause:
 1" = 1 Mile or
 1/2" = 1/2 Mile.

Brush Pile _____
 Controlled fire _____
 Out upon Arrival _____
 Could not locate _____
 Other _____
 (Specify)

Date _____ AM _____ PM _____ Time Record

Reported by: _____

Reported to: _____

Name _____ left _____ with _____ men

Arrived at Smoke _____

Returned from Smoke _____

Distance Travelled _____ Cost _____

Time Spent _____ Cost _____

Land Owner's Name _____

Permit Fire _____
 (Yes) _____ (No) _____ (Req.) _____

Did Owner know of fire? _____

Did you explain: Fire Laws? _____
 (No) _____ (Yes) _____

Notifying tower of future
 burning? _____

Remarks: _____

Submit in duplicate to the
 District Forester

Signed _____
 Title _____
 Date _____

LOCATION OF FIRE TOWERS AND FOREST FIRE WARDENS BY COUNTIES

Brown County:

Brown County Fire Tower, Nashville, Indiana. Telephone - Belmont Exchange.

Towerman - C.C.C. Veteran Enrollees

J. K. Lilly Tower, Nashville, Indiana. Telephone - Nashville.

Towerman - Edward Wayman, Nashville, Indiana

E. D. Warford, Trevlac, Indiana. Telephone - Morgantown Exchange.

Fred Harsch, R. #1, Trafalgar, Indiana. Telephone - Trafalgar 39 F 30.

Raleigh Deckard, R. #5, Nashville, Indiana. Telephone -

R. Z. Lutes, R. #5, Columbus, Indiana. Telephone - Belmont Exchange

Rufus Phillips, Freetown, Indiana. Telephone - Bellville Exchange.

Clarke County:

Clark County Forest Tower, Henryville, Indiana. Telephone - Henryville.

Towerman - James Brishaber, Henryville, Indiana

Borden Tower, Borden, Indiana. Telephone - Borden Exchange.

Towerman - Raymond Johantgen, Borden, Indiana.

Lawrence Cooley, R. #1, Borden, Indiana. Telephone - Borden 2911.

Stanley Murphy, Charlestown, Indiana. Telephone - Charlestown 66 F 6

M. J. Durham, Borden, Indiana. Telephone -

Charles Gray, R. F. D., Scottsburg, Indiana. Telephone -

Floyd County:

Floyd County Tower, Georgetown, Indiana. Telephone - Lanesville 39 F 21

Towerman - Henry Ballard, R. #2, Georgetown, Indiana

Joseph Riley, R. #2, Georgetown, Indiana. Telephone - Lanesville 39 F 3

Thomas P. Pliass, R. #2, New Albany, Indiana. Telephone - New Albany 54 F 2.

Owen Shewmaker, R. #2, Georgetown, Indiana. Telephone - Lanesville 44

J.R. Martin, Elizabeth, Indiana. Telephone - Elizabeth Exchange.

Harrison County:

Harrison County Fire Tower, Harrison County State Forest. Telephone - Corydon Exchange.

Towerman - Lafe Cline, Corydon, Indiana

Stanley H. Meyers, Corydon, Indiana. Telephone - Corydon 5715.

William Enlow, New Amsterdam, Indiana. Telephone - New Amsterdam Exch.

Earl Rothrock, R. #1, DePauw, Indiana. Telephone - Milltown Exchange.

Jackson County:

Jackson County Forest Tower, Brownstown, Indiana. Telephone -
Brownstown Exchange.

Towerman - Roscoe Overshiner, Brownstown, Indiana.

S. E. Ashcraft, Freetown, Indiana. Telephone - Freetown Exchange.
William Pray, Medora, Indiana. Telephone - Medora 27.

Jefferson County:

Jefferson County Tower, Wirt, Indiana. Telephone - Hanover 8411
Towerman - Gaylord Boyd, Wirt, Indiana .

Joseph Officer, \$. #1, Wirt, Indiana. Telephone - Madison 18 - 23
Bernard Ringwald, R. #1, Madison, Indiana. Telephone - Rellview 1-LL
Carl Burke, R.#2, Deputy, Indiana. Telephone - Hanover 8420

Jennings County:

Jennings County Tower, North Vernon, Indiana. Telephone - North
Vernon 156 R.

E. H. Bundy, R.#4, No. Vernon, Indiana. Telephone - San Jacinto or
Grayford Exchange.

Sebe Green, Commisky, Indiana. Telephone -

Monroe County:

Morgan-Monroe Forest Tower, Martinsville, Indiana. Telephone -
Martinsville, Indiana.

Towerman - Moses Coffey, R. #5, Martinsville, Indiana.

Gilbert Weaver, Gosport, Indiana. Telephone - Paragon 16 R 1.

Ben Sarber, Unionville, Indiana. Telephone - Unionville Exchange

Morgan County:

Morgan-Monroe Tower, Martinsville, Indiana. Tele - Martinsville
Towerman - Moses Coffey - See Monroe County.

Roy McLary, Morgantown, Indiana. Telephone - Morgantown - Day 24
Night 26

Pulaski County:

Jasper-Pulaski Co. Tower, Medaryville, Ind. Tele - Medaryville 64F50
Towerman - C.C.C. Enrollees

C. C. Blinn, Winamac, Indiana. Telephone - Winamac 338.

Starke County:

No Tower.

Burl Binkley, Kankakee Game Preserve, Knox, Indiana. Telephone -
Lacross - Call WPA

St. Joseph County:

No Tower.

A.D. Heath, R.#2, New Carlisle, Indiana. Tele - New Carlisle 23

Greene County:

Greene County Fire Tower, Cincinnati, Indiana. - Telephone -
Towerman - Harley Sparks, Solsberry, Indiana.

Curtis Armstrong, Springville, Indiana. Telephone - Springville.
Wilbur Hutcheons, Springville, Indiana. Telephone -
Hugh G. Freeland, Bloomfield, Indiana. Telephone - Mrs. Ed. Ranard,
Bloomfield, Indiana.

Martin County:

Martin County State Forest Fire Tower, Shoals, Indiana. Tele - 2083
Towerman - Roscoe Tow, R. #4, Shoals, Indiana.

Charles Dickey, Shoals, Indiana. Telephone -
M. J. Warren, R.#3, Shoals, Indiana. Telephone - Shoals 106U
L. E. Kern, Trinity Springs, Indiana. Telephone - Jim Sargent, Trinity
Springs, Indiana.

Orange County:

Orange County Fire Tower, Paoli, Indiana. Telephone - Paoli Exchange
Towerman - George Cook, R. #1, Paoli, Indiana.

S. E. Harvey, Valeene, Indiana. Telephone - Valeene, Indiana
Charles Redus, R. #2, Campbellsburg, Indiana. Telephone - Dennis
Garage, Livonia, Indiana.
Doyel Peyton, R. #1, Paoli, Indiana. Telephone -

Owen County:

McCormick's Creek State Park Fire Tower, Spencer, Indiana. Telephone -
Spencer Exchange.
Towerman - T. L. Franklin, Spencer, Indiana.

H. Wayne Barnes, R.#4, Spencer, Indiana. Telephone - 215F3.
Tyson T. Bixler, Spencer, Ind. Tele - Brown's Tire Shop, Spencer, Ind.
Charles Franklin, Stinesville, Indiana. Tele - Ellettsville Ex. 2 on 16

Pike County:

Pike County State Forest Fire Tower, Winslow, Indiana. Telephone -
No Towerman.

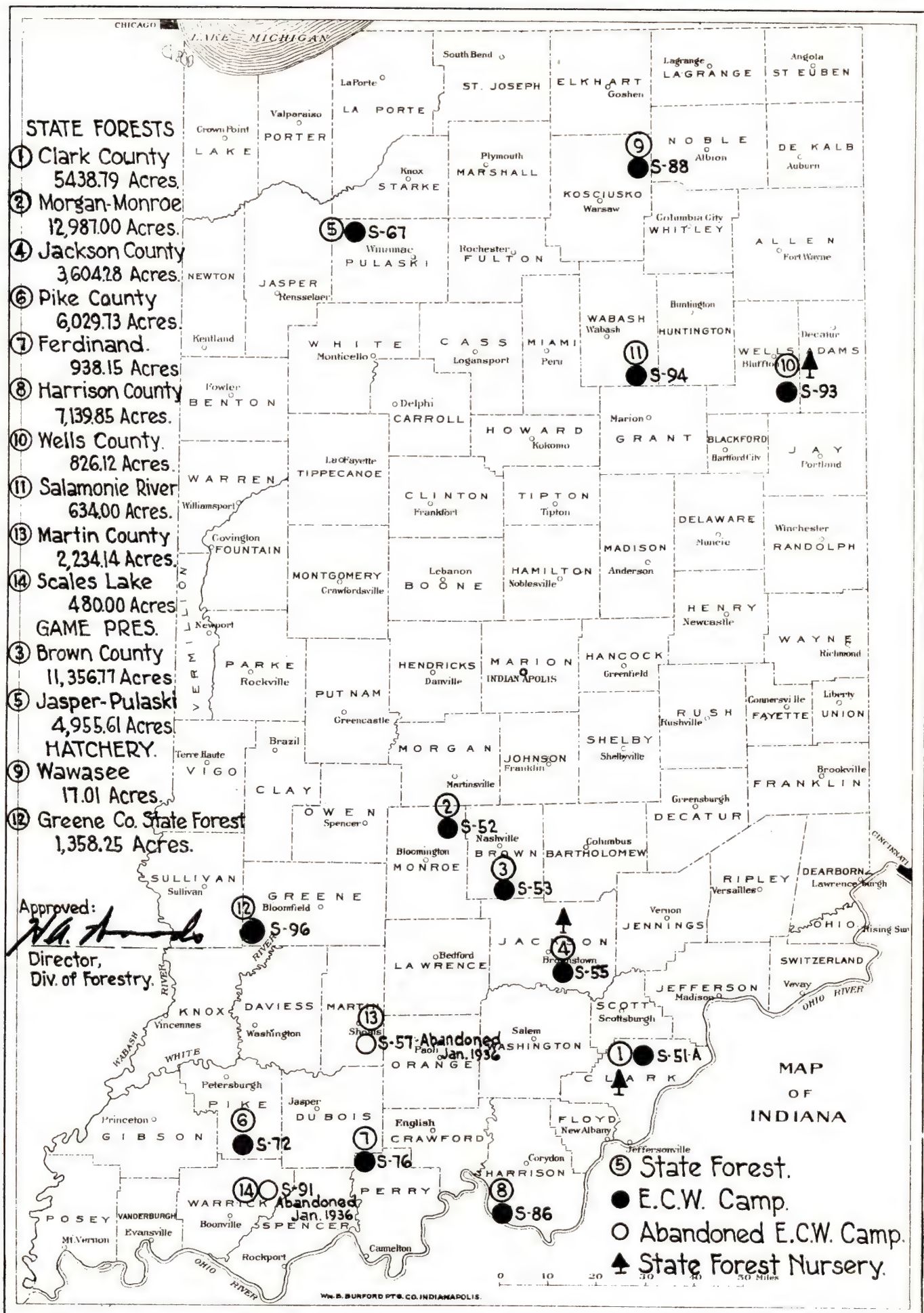
J. D. McClure, Winslow, Indiana. Telephone - 4693 $\frac{1}{2}$
Leo Howard, Velpen, Indiana. Telephone - Howard's Store, Velpen,
Indiana.

Spencer County:

Spencer County Fire Tower, Lincoln City State Park, Lincoln City,
Indiana.

Towerman - Clyde Varner, Lincoln City, Indiana.

Rush Richardson, R.F.D., Lincoln City, Indiana. Telephone -



STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

Forest Fires, Their Prevention and Control

To understand fully the problems of protecting a forest from fire, it is necessary to have some knowledge of what causes them. All the causes, excepting one, may be laid to man. History shows that the pioneer who settled this region was confronted with the problem of disposing of vast quantities of timber in order that he might farm. So, in order that this could be done with the least amount of effort, the neighboring farmers got together and had timber burning bees. From this practice, it is reasonable to say that at least part of the current custom of burning off the woods was derived from pioneers.

Why One Should not Burn the Woods

In order to relate the damage sustained it is necessary to first diagnose the physical parts of a forest, which are the soil, the root structures, the humus, and the plants themselves.

Soil.

Soil, in its natural state, is composed of two constituents, organic and inorganic. These are both essential in constituting a proper forest soil. When fire runs over natural soil, the organic component is destroyed, and the inorganic matter is dissolved and carried away with the water. Before the fire, the soil was protected by humus, which is the thick layer of decomposed and partially decomposed leaves.

Humus.

This material is the natural fertilizing agent of the forest soil itself. The natural working-in of decomposed material causes soil to become porous, allowing the infiltration of water and air. When humus is destroyed by fire, which always happens when fire is allowed to run over the forest floor, the soil becomes more or less dry and hard, and the roots of plants do not receive the nutritious benefits that they would otherwise have received. Humus is also a natural sponge which is capable of holding in reserve vast quantities of water. Again, when this is destroyed by fire, there is nothing to hold excess water, and in hilly country there is a rapid run-off which is one of the causes of floods.

Tree Injury.

The bark of the hardwood species is very thin in comparison with that of some of the evergreens, consequently, when fires burn this bark, it cracks and allows openings for disease and

Forest Fires - 2

insects to enter. That is why, in many instances, after a tree has been cut, we find a great portion of the butt-log, which is always the most valuable, damaged to the extent that much of it is useless. Fire either kills entirely or deforms young seedlings which are the future crop of the forest.

Game.

In addition to the damage done to the soil, humus, and the plants themselves, this same forest that has been so affected, is, or should I say was, the home of many wild creatures.

European Practices.

Due to the large amount of natural resources existing in America, it has only been in the last forty years that any attention was given to the protection of forests from forest fires, except in a few segregated instances. Europe, and particularly Germany, has practiced Conservation and Forest Fire Protection since the middle of the Ninth Century. At one time, in the Province of Prussia, the penalty of death was administered to persons who maliciously set fire to a forest. There are forests in Germany today which fires have not touched for centuries.

About two years ago, the writer was privileged to go to a forest fire with an European Forester. This man was so excited, and became so alarmed that he threw precaution to the wind and was nearly burned in attempting to extinguish it. Upon talking afterwards, he disclosed that this was the first forest fire he had ever seen. Much to my surprise, and much to my American shame, he told, in no uncertain terms, that they do not have forest fires in his country.

Why Are We so Neglectful About Fires?

Is it because, as one British writer recently stated in a current periodical: "Americans never give a damn, and never had to give a damn." Or is it because, in an effort to become a great manufacturing and industrial nation, Conservation of these natural resources has been overlooked?

The Problem Must be Met.

It is a common belief among Conservationists, that with the proper legislation and extensive education, the problem will finally be solved. This, however, will take time, and in the meantime, those charged with the custodianship of natural resources must take steps to conserve and protect that which remains. Consequently, vast sums of money are necessarily spent each year to keep in operation the various existing Forest Fire Suppression organizations, both State and Federal.

Laws.

In 1905, the Indiana Legislature passed the present fire law. These can be reviewed by referring to the Forest Fire Manuel, page 44.

There was great rejoicing, according to reports, among the heads of the Conservation Department at that time. The Secretary of the Board of Forestry went so far as to say that there was the best piece of forest fire legislation yet passed in all America, that it could not help but work, that the problem was finally solved. Yet thirty-two years later, Indiana had, in one year, a total of approximately five hundred forest fires covering nearly twenty-five thousand acres, with an estimated damage of over three hundred thousand dollars. Evidently the forest fire problem in this State was not solved with the passage of the forest fire law.

Road supervisors, the office does not exist today, its duties now being that of the township trustee, were authorized to use their labor for the suppression of forest fires to the extent of paying a dollar and a half a day per man. Do not think this as criticism of predecessors, or lack of respect for the fire law, but later you will see why this set-up did not work.

Very little can be found in the annual reports concerning this problem. In all probability, it was the old system of shutting one's eyes, followed by the old adage - "What one does not see does not hurt him." During all this time; however, the United States Forest Service had been carrying on, in its western holdings, a fire prevention and suppression program. The right-thinking people of America began to become alarmed at the fire situation, but it was not until 1921 that the Clarke-McNary Act, fostered by Senators McNary of Oregon, and Clarke of New York, was passed.

Clarke-McNary Act.

From then on, the work of preventing and suppressing forest fires gained momentum. This act allotted funds to the Forest Service, which were in turn passed on to the various States who had forests to protect and who met certain technical requirements. It is under the provisions of this act that the Department of Conservation in Indiana carries out its forest fire program today.

Now to explain why the set-up of 1905 did not work. The road supervisor had the authority to use his labor and his appropriations, or allotments, on the suppression of forest fires. However, this money came out of his regular road allotment; there was no additional money appropriated for this purpose. The road supervisor or township trustee was placed in office by his constituents for the purpose of constructing and maintaining certain roads. Consequently, the road supervisor, knowing that the condition of the roads would determine his success or failure, did very little on forest fire suppression.

Fire Program.

The forest fire program is divided into three activities, which are prevention, detection, and suppression.

Prevention consists of the education toward care with fire, the removal of fire hazards, and the development of barriers such as fire breaks, roads, et cetera.

Detection, today, narrows itself down to a system of fire towers, or lookouts, connected to a centrally located headquarters by proper communications.

Suppression consists of the organized combat forces thoroughly trained and equipped.

Volunteer Organizations.

The history of the fire program in Indiana starts with the enactment of the Clarke-McNary Act. This bill was not approved by the State Legislature until 1929, making it possible for Indiana to receive Federal funds in the fight against forest fires. From 1930 to 1933, the organization on fire suppression consisted of volunteer groups organized by the District Foresters. This was accomplished to some degree of efficiency in two counties - Brown and Jackson. It so happens that the people in these two counties have, to some extent, been more or less Conservation-minded, and fortunately were by two outstanding County Agricultural Agents. How far this system went in other counties, is uncertain.

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In 1933, into the forest areas of the state came, the Civilian Conservation Corps Camps. These boys, under the supervision of foresters, immediately took hold of the fire suppression activity, consequently, the volunteer organizations died a rapid death. The feeling was - "These boys are getting paid to put out fires; why should we attempt it for nothing." Not a healthy situation. It led to carelessness on the part of the people because they realized that if fire did get from under their control, the CCC boys would soon put it out. This continually grew worse. In fact - several camps were little more than fire departments in the dry season. Time which should have been spent in useful construction and maintenance projects on State property was spent in chasing John Jones' fire that he carelessly let get away. The Commissioner and the State Forester, sensing this condition, and realizing its devastating possibilities, after a conference with the Forest Service Clarke-McNary officials from Milwaukee, decided to establish a new control system.

Two District Foresters were appointed and assigned districts. Then, with the help of the Forest Service men, re-organization was started. Today, this organization is not quite two years old. Some has been accomplished but much more is

yet to be done.

Present Organization.

The State was divided into three forest districts, known as the Northern, Southeastern, and Southwestern districts. The Northern District comprises all land north of United States Highway No. 40. The Southeastern District includes that portion lying south of U.S. Highway No. 40 and east of State Road No. 37 with headquarters in the Jackson County State Forest at Brownstown. The Southwestern District includes all land lying south of U.S. Highway No. 40 and west of State Road No. 37. The headquarters for the Northern District is in the Indianapolis Office since, as yet, no district forester has been assigned to that area.

Problems of District Foresters.

First - a complete survey of the efficiency of the detection system had to be made. I might point out here that Indiana is one of the few States which has not had a complete topographical map made of it. These maps give relative elevations. Without them, the job of locating towers on the most efficient high points is one of a hit or miss proposition. Twenty fire towers had already been erected. After a complete visibility survey, with the use of special precision instruments, it was found that three towers had to be dismantled and moved, the remainder needed to be extended twenty feet in height, and eleven additional towers were needed.

Fire Wardens Appointed.

In August, 1935, the Commissioner approved the Clarke-McNary Budget for the year, which included an item for paid suppression. This meant that the office of Forest Fire Warden was created. The District Foresters were given full power to appoint some sixty-five of these men. Their qualifications were that they must be of high type, well-thought-of citizens, interested in Conservation, and have a car and a telephone. Through the combined efforts of County Agents, Conservation Clubs and Camp Superintendents of the Emergency Conservation Work Camps working with the District Foresters, these men were soon appointed. As each of these men was to supervise ten fire guards, the job of organizing each crew was then accomplished. The Forest Fire Warden is paid twenty-five cents an hour and five cents mileage for the use of his car. The Fire Guards, or his crew-men, are paid fifteen cents an hour while fighting fire. These wages, from the purely monetary standpoint, were not inducive to the extent that we were over-run with applications, but rather, and this is as it should be, the applicants were men who were more interested in Conservation than in the money that the job offers. However, the pay does make them feel that their time and effort is appreciated. After these crews were organized, came the job of equipping and training them. Each

fire crew is now equipped with ten fire rakes, one axe, one first aid kit, one crosscut saw, one five or seven gallon Indian back pack pump, one five gallon Indian supply tank, and in some cases, four or five beaters where grass fires are prevalent. Each of these tools are here on display.

First Fire School

As the training of each individual crew would necessarily take a great deal of time and expense, the Fire Wardens were assembled at a fire school held at the Headquarters of the Southeastern District in October, 1935. This school lasted for two days. The first day was devoted entirely to the methods of making reports, expense vouchers, payrolls, and the proper procedure of law enforcement. The second day was devoted entirely to methods of suppressing fires by the use of black-board illustrations and finally, the fighting of a mock fire in the field with constructive criticisms given by the District Foresters. Similar schools will be held annually. In January, 1936, the Forest Fire Manual was printed and distributed to these men. The most important job the fire warden has, outside of the actual extinguishing of the fire, is the execution of the fire report, copies of which have been distributed to you. This report is identical with that used by the United States Forest Service. A problem cannot be met until the causes are fully known, hence, the calendar year of 1936 was the first year that complete figures on causes of fires, number of fires, and acres burned were known. The results of these figures will be discussed later.

Heavy Equipment.

Fire suppression necessitates the use of special heavy equipment. The State of Michigan conducts a forest fire experiment station which devotes its entire time to the construction of specialized equipment for this purpose, and in the North Central States, has the outstanding forest fire suppression organization. The State of Michigan spends one million dollars annually on forest fire suppression. Yet, one acre of Southern Indiana hardwoods is worth 10 acres of the forest growth in Northern Michigan.

An outstanding forester in the annals of American Forestry said: "A common mistake which has been made in forest protection has been an effort to economize and get on with a sort of half protection. In the Great Lakes Region, this has been worse than no protection at all; for it merely led to contempt on one side and discouragement on the other. Ten years of strict protection would have made further protection easy and much less expensive."

Foresters and conservationists must realize, if they do not already, that Indiana is blessed with the natural constituents from which the best hardwoods of the world can be raised. As an example, shipments of white oak and black walnut in the raw log have been made from Jasper, Indiana to Germany. Yes,

the statement that ten acres of Michigan woods is not worth one acre of good old Indiana hardwoods, goes still further. It would take one hundred acres of western pine for the same acre of Indiana woods. It is a scientific fact that the best hardwoods in the world are grown in the section of the Ohio and Wabash Valleys which constitute the State of Indiana. Consequently, this heritage of ours must be preserved.

You men, as Game Wardens, have the responsibility of seeing that the game and wild life of this State is fully protected. Game is a by-product of a properly protected forest. As Conservationists, particularly interested in Game Propagation, you should know that you cannot burn a man's house down and expect him to live in it. Without the proper protection from forest fires, any Conservation program, whether it be fish and game, whether it be forestry, or whether it be any other function of a so-called Conservation program, is lost. If this talk has impressed you men of one fact, that, fish and game will not survive if promiscuous burning is allowed to continue, then the mission has been fulfilled.

The thought in your mind probably is - this is all very interesting and I appreciate knowing these facts, but how am I, as a Game Warden, able to do anything about it?

In as far as Conservation is concerned, forget that you are Game Wardens. That particular sub-division of authority should have no direct bearing on the point that Conservation of Natural Resources Should be Foremost in your Minds. All in all, you as a Game Warden, myself as a Forester, John Jones as an Engineer, and Sam Smith as an interested citizen, are working toward one inseparable end.

Detection Problems.

Each member of the Department of Conservation in Indiana should appoint himself as a Game Warden, a Forester, and Entomologist, and an Engineer to see that the objectives are fully carried out. As far as the fire program is concerned, you should report every violation of the fire law that comes to your attention, and most important of all, you also report every fire that you see to the nearest fire tower, or forest fire warden. In addition to this, in all your contacts with Conservation Clubs, Civic organizations, and individuals, inculcate the principles of forest fire protection.

Explanation of Permit Law

In Michigan, they have in effect a Fire Permit Law. When a person wishes to burn off a field, brush, rubbish, et cetera, it is necessary, by their law, that he go to the nearest Conservation Headquarters and, from the Conservation Officer, obtain a permit to do so. This permit is written in triplicate and states that he is hereby permitted to burn in such and such a section, township so and so north, and in such a range, on a certain date, after the hour of four in the afternoon.

Forest Fire - 8

The citizen receives a copy of this, a copy is retained by the Conservation Officer in his Headquarters, and the third copy is handed to the local fire tower lookout. So - on this particular date when the fire tower lookout sights a smoke and records it on his instrument as being in the same location as the fire on the permit, he knows that this fire is authorized, and of no concern of his, thereby saving the time and money of calling out a fire warden and his crew.

Need of State Wide Permit Law.

"When is a fire really a fire?" The towerman in a fire tower in this State knows the importance of this question. He has seen as many as fifteen smokes in one hour. Upon the first sight of smoke, he is not alarmed and does not do anything about it. He knows that it is probably Jim Johnson burning a brush pile, and will watch it to see if the smoke subsides. Fortunately, in this particular instance, the smoke does subside inside of eight to twelve minutes. In the next case, however, it does not. The smoke grows continually larger, so that after about twenty minutes, this experienced towerman, decides that he better call out a crew. Remember, this fire has had a twenty minute start before the towerman decides to call out the crew. It usually takes from a half to an hour for the crew to get to the fire. This means that the crew got to the fire exactly one hour and a half after the smoke was first sighted. In that time, fire may burn over some fifty acres, which would have been reduced by half, had a permit law been in effect.

Permit Law for State Lands.

The Commissioner of the Department of Conservation, on December 9th, 1935, put into effect a permit law in relation to properties belonging to this Department. The law may be reviewed on page 42 of Forest Fire Manual which you just received.

This means that it is a criminal offense to burn anything within one half mile of any State property without a permit. When the time comes that a permit law can be executed in all parts of the forest area of Indiana, then at least legislatively, forest protection can be obtained.

Prevention.

Nothing has been said concerning the most important of all functions: Prevention. This consists of education first and reduction of fire hazards second. The Educational phase of this work can best be explained by the charts. The Calendar Year of 1936 gave the first complete figures in acres burned, number of fires, damages sustained, et cetera, which have proven to be interesting.

Extemperaneous Chart Lecture.

From these figures one can readily see that the foremost problem narrows itself to one of direct contact with the farmer and land-owner in the hazardous areas.

Education.

On February 22nd, this year, there was instigated a ten-day educational program in which all the forest fire wardens and towermen took part, at which time all the phases of education were emphasized. The results of this program are yet to be seen.

Detection Problems

The Remainder of the time allowed will be devoted first, to problems in detection, using the Osborne fire finder which has mounted here, and second, to the principles involved in the proper suppression of running fires.

Summary

In closing, the Division of Forestry's responsibility in the suppression and prevention of forest fires is of a paramount issue to all Conservationists. None of us should weigh this issue lightly. It will only be through combined efforts and the whole-hearted cooperation of every one that this menace of Conservation can finally be stamped out.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

Trees; Forest, Windbreak & Erosion plantings; State nurseries.

A tree is considered as one of the members of a complex community of animals and plants living together. It has three growing parts, first, the buds found on the end of the branches; second, the root tips; and third, the cambium layer which is the growth layer.

GROWTH OF A TREE

The buds expand into twigs which increase the height and spread of the tree. In order to produce a straight tree which means a straight log, the terminal buds must be protected from injury by insects or crowding from other growth. Some trees like the pines stop growing early in the summer. Others such as some species of poplar grow until stopped by cold weather.

The root tips are the second part of the tree growing in whatever direction moisture occurs and from the water they take up minerals which are used as plant food. From the root tips this water containing mineral passes through tiny tubes and cells in the wood to the crown of the tree. The food material is processed in the leaves with the help of the sunlight and is returned to various parts of the tree for its use.

The cambium layer is the thin layer of cells which remain just beneath the bark of the tree. It is the place where the subdivision of the cells is made and a new layer of wood is formed each year causing the characteristic annual rings and in addition a new layer of bark is formed. The wood tissue formed in the spring is very thin walled and porous. The summer wood tissue is very thick walled and dense. Summer wood contains more actual wood substance in the form of fibers and thick walled cells than the spring wood, therefore is much stronger.

It is a very generally known fact that the more leaves a tree has the more rapid is the growth of the tree and the new wood. Rapid growth ordinarily results in the production of strong wood. Wide annual rings and strong wood is produced by trees that have plenty of crown space, root space and a moist and fertile soil. Anything such as thinning of certain stands of trees which helps the condition mentioned above will improve a stand of timber.

GROWTH OF NATIVE TIMBER

The growth of timber in Indiana varies according to the site and to the kind of trees. This growth is usually determined in an estimate of the board feet per acre per year.

The poorer timber types on the poorer soils produce as little as 100 board feet per acre per year. The better bottom land timber will easily grow at the rate of 350 board feet per acre per year. These figures are of course for ideal conditions considering fully stocked stands but they do give some idea of the possible production of timber to the owner of a farm woods.

It would be well to point out that any good farmer manages his farm so that he can produce the most corn or wheat per acre. A woodland must be managed in exactly the same way to yield the best returns on the investment. Every Indiana farm contains a certain amount of waste land. Some counties in southern Indiana

contain very large areas of worn out abandoned farm land. It produces no revenue either for the owner or for the state and is an economic liability. Much of this land in southern Indiana, as well as the so called "useless" farm land in northern Indiana is ideally adapted to the production of timber. In cases where natural regeneration has failed to reforest these fields, an artificial forest must be established by planting.

In the beginning, it was mentioned that the forest is a complex community of plants and animals. It can further be stated that in a virgin or uncut forest that the plants and animals are in a constant state of equilibrium and balance. The intensive use of the forest for the production of timber has distributed this balance and a partial restoration is necessary before timber lands can be used for a near capacity of timber.

ENVIRONMENT OF TREES

There are many factors of environment which enter into the growth of the forest and most of these depend on sunlight and moisture. In other words, trees growing in the shade do not receive as much sunlight as one in the open. A tree on a dry sand hill does not receive as much moisture as a tree in a rich fertile bottom. Another factor of environment is the soil. Soil conditions vary greatly and trees have grouped themselves into various associations. This can be readily noticed in Indiana by the soil types. For instance the sand hills of northern Jasper and Pulaski Counties produce black oak while the bottom lands of the Wabash river a few miles farther south produce black walnut, oaks, hickories, etc. The soil temperature also has a decided effect on trees particularly in their early life. Another factor is the temperature of the air in Indiana. This factor is not so important but in the mountainous regions of California and Oregon the different kind of trees is found growing on the mountain tops than in the valleys. Another factor very important is the soil character. By this it is meant there are many different kinds of clay. The tight impervious clay of the "flats" in Jennings and Ripley Counties produce different kinds of timber and trees, and has different conditions than the trees found in Brown County. Both soils are clay. The first mentioned is very wet in the fall, winter and spring and packs very hard and bakes in the summer. This packing occurs even in the woodlands. The freezing and thawing causes considerable frost heaving which limits the trees found on this land to a very few varieties which have a long tap root and can withstand such frost action.

Another characteristic in which there is very great variations is the plant food material that is available to different plants. Trees are a little different than other members of the plant kingdom in that they require certain food material for proper growth. A good example of this is the fact that corn is very seldom found on the tops of knobs in Brown County, mainly because the soil and plant food conditions are not suitable for corn. This is comparable to all kinds and varieties of trees and shrubs. The environment and the changes of environment influence greatly the timber types and changes such as drainage will cause the loss of entire forest areas due to the dropping of the water table as well as the wholesale destruction of many smaller shrubs and plants.

GROWTH OF THE FOREST

Stands of timber in Indiana are usually considered as hardwood stands. Although in one small section of the state, Virginia pine is found growing native. A stand of timber is spoken of as a pure stand when 80 per cent or more by volume is made up of one species. When a stand by volume is made up of more than one species it is spoken of as a mixed stand. The height and diameter of a tree is what the person interested in timber production is trying to obtain. The height nearly always depends on the soil and moisture. The diameter depends on the growing space for branches and leaves. In its early development a tree grows rapidly in height but increases very little in diameter. After it has obtained a considerable height growth the crown fills out and the diameter development begins. In giving the fundamentals of tree growth it can easily be seen that the forest soil cannot be improved quickly but must be done over a long period of time mainly by the exclusion of forest fires. The growing space for each tree can be improved materially. In this connection, it might be well to define a weed tree. The forester's definition states that weeds are trees or shrubs of any size that occupy space needed by more valuable trees. Obviously under this definition a tree can be a weed under some conditions and a crop tree under others. The Division of Forestry has always believed that certain trees normally classed as weed trees provide sufficient food and cover for wild life and they must be recognized in the same way crop trees are recognized. Since quail, pheasant, squirrels and other animals and birds are as much a product of the land as are trees, any recommendations for timber improvement should be considered with this in mind.

Tree tolerance is a term that is used in referring to the reaction of different trees to the combined influence of light, moisture, soils, etc. The most noticeable difference is the amount of sunlight needed by trees of various species, so it is commonly understood that a tolerant tree is one that tolerates and endures considerable shade and an intolerant tree requires an abundance of sunlight. More common varieties of the least tolerant are the black locust, butternut, poplar, sassafras, sumac and persimmon. A few shrubs and vines in this same class are the blackberry, raspberry, green brier, grape, bittersweet and many others. This fact accounts for the complete absence or the presence of such plants in a dense or thin stand of timber as the case may be. Any planting of trees must of course take these facts into consideration and from the above conclusions it is obviously impossible from a foresters standpoint to plant sugar maple or ash in an open field and expect it to survive and reach any considerable height or diameter. These species must be planted in thin places in woods or with quick growing species so that they will be shaded and be required to come up through the crowns of the faster growing trees.

IMPROVEMENT OF FOREST STANDS

It naturally follows that any improvement of forest stands that are made must take into consideration the factors of environment, the factors of tolerance which of course include the soil growth rate, the form, clear length of logs of a tree and the spacing of the final crop trees.

PLANTING FOREST TREES

The Division of Forestry owns and operates three nurseries having an acreage of approximately 90 acres. These nurseries produce seedlings especially adapted for reforestation, erosion control, windbreaks and game food planting purposes. At the present time all hardwood seedlings with the exception of black locust are sold for \$5.00 per thousand. Locust seedlings are sold at \$2.50 per thousand. Coniferous stock is sold at \$10.00 per thousand. Trees are sold not to exceed the price of production.

In order to obtain these seedlings it is necessary to make application to the Division of Forestry on blanks provided for that purpose. The purchaser must sign an agreement stating that the trees will be planted for reforestation, windbreak and soil erosion control purposes and that they will not be used for landscaping.

Almost all of the hardwood seeds are collected within the state. These seeds are picked from very carefully selected seed trees and are either planted in the fall or stratified over the winter in layers of sand until the following spring when it is planted in the nursery.

The conifer seed is of course purchased from reliable seed collectors on carefully prepared specifications which usually cover altitude, latitude and longitude at which the seed is collected.

Hardwood seedlings reach planting size in one year. This includes all of the oaks, elms, ash, tulip poplar, maple, black walnut and osage orange. The coniferous trees grow very slowly as seedlings and usually are grown for two years in the seed beds. Then, they are transplanted into the transplant rows. From these transplant beds, they are dug when they reach large enough size to plant in the field.

Shipments are made from the nursery at one season of the year, usually from the 15th of March until the 15th of April. The trees are dug, sorted, graded and tied into bundles before being packed in the boxes for shipment. It is very important that the trees not remain out of the ground for a very long time before planting. Very great care must be used in handling the trees as the roots can not be exposed to the air except for a very short time. The windy March and April days soon dry out the roots making it useless to plant the trees if the roots have not been kept moist. It is just as important to keep the tops dry since any moisture remaining on them would easily freeze the seedlings. The trees must always have moist mineral soil packed in tightly around the roots when they are planted. Any sod or litter will allow an air space around the roots and dry them out, causing the trees to grow slowly.

More detailed instructions on the exact method of planting trees can be found in the bulletin of the Division of Forestry.

PREPARATION OF THE SITE FOR PLANTING

On most open field plantings no preparation of the site is needed. In many cases a very heavy sod is found. In such cases it is necessary that the sod be plowed under the previous fall before planting is made in the spring. In rough country the

plowing should follow the contours of the hill.

On extremely wet planting sites it is sometimes necessary to break furrows where the trees are to be planted and plant the trees on the tops of the furrows. If the trees are to be planted in heavy brush or grass, it is sometimes necessary to cut the brush back until the trees begin to establish.

SPACING

The most common spacing used in all plantings in Indiana is either 5 x 5 or 6 x 6. The closer spacing favors earlier cover for the ground and taller and cleaner boles.

SELECTION OF TREES TO PLANT

In selecting the proper tree to plant very great care must be taken so that the tree will be adapted to the soil, moisture, light and the other factors of environment which were mentioned previously. The soils in general can be graded into their deviations as to the material from which they are derived. The best soils, both from a farming standpoint and from a timber production standpoint are those derived from glacial action such as the soils of northern and central Indiana. In general, however, they must be graded as follows: The best are the soils derived from limestone, and the next best are the soils derived from shale. The next are the soils derived from sandstone and poorest of forest soils are those made up of sand. This fact is well illustrated by the sand dunes of northern Indiana as being the poorest forest soil type. The limestone soils in the vicinity of Bedford, Mitchell and Paoli will illustrate the productiveness of the better class of soils that are derived from limestone.

Another very important consideration is the moisture. Some trees require moisture throughout the entire year and in addition to this a steady supply of moisture must be available at all times. It is just as important in others that they not receive an excess in moisture such as would be caused by the overflow in bottom lands.

PURPOSE OF PLANTING

Another very important factor in making any planting of forest trees is to consider the purpose. Obviously a person would not desire to plant one of the pines if they desired the timber for fence posts nor would they plant black walnut for windbreaks. The general rules can be briefly summed up as follows: First, the poor sand soils require one of the pines, preferably Jack, red or Scotch in the order named. The muck lands of this same area in the state have not been planted and very little is known about them except for windbreaks which are planted one-tenth of a mile apart in strips, using one row of arbor vitae spaced 3 to 4 feet and one row of green or golden willow spaced 2 x 3 feet. This planting makes a very effective windbreak for these lands. The better soils require individual recommendations as there are many places where the soil is deep and rich and other places where it is shallow and underlaid with gravel. These areas require special treatment. Black locust is best adapted for any erosion in the state with the exception of the sand land mentioned above, since it has a very fibrous root structure and will grow rapidly. The clay soils of the state

are more adaptable to a very great variety of trees where the soil fertility is good. It is suggested that tulip poplar, walnut, ash and other similar species be used. Where the soil fertility is very poor and there has been considerable erosion; the result in most of the top soil is bad and it is sometimes necessary to resort to the planting of coniferous trees, namely white, red, Jack and Scotch pine. In some few cases in southern Indiana plantations can be made using the southern pines, that is the pitch, Virginia and shortleaf pine.

It can be seen from a summary of the above that the planting of forest trees is by no means a complicated process as some people will lead you to believe. There are certain fundamental rules that must be closely followed if the plantations are to succeed. First, and most important, fires must be excluded. Second, it is necessary that the planting be correctly done, that the trees be planted with their roots in a natural position. Third, it is necessary that the failures in the plantations be replanted within two or three years, following the original planting. Fourth, and probably the least important from the standpoint of success or failure is the spacing between the trees. The spacing should be preferably 5 or 6 feet. A wider spacing produces large limbs which means large knots in the logs. Close spacing is of little advantage since it utilizes many times more trees, the trees themselves being closely spaced are as vigorous as trees spaced slightly wider.

PLANTING OF WINDBREAKS OR FARM HOMES

Planting of windbreaks should be encouraged by each farm owner. The windbreak is planted in 2 to 5 rows of trees spaced about 10 x 12 or 12 x 12. This means a spacing of 12 feet between the rows and 12 feet between the trees in the rows. A wide spacing is necessary so that the lower limbs will retain their foliage, making a dense protection against the wind. Conifers, that is the pines are always to be preferred for windbreaks, and no windbreak for a home or buildings is to be recommended of hardwoods. Windbreaks for fields, such as hedge rows are to be highly recommended. In this case they are usually single rows of trees. Most hedge windbreaks are planted on a close spacing of approximately 2 to 3 feet or less. For the better soils a mixture of white and red pine is recommended. For the poorer soils such as the poor sand or very poor clay, a mixture of Scotch and Jack pine are recommended.

DIRECT SEEDING

Many times it is desirable to plant the seeds or nuts of different trees in preference to seedlings. In these cases, consideration should be made of the following facts: first, direct seeding should not be done where there are rodents such as field mice that will dig up the seed. Squirrels and chipmunks are especially bad with hickory nuts, acorns and walnuts. Plantations can be made by direct seeding only where such animals are not present. Second, any seed to be planted must be either planted in the fall or stratified over the winter between layers of wet sand so that the germ in the seed does not dry out, since it is useless to plant poor seed that will not germinate. The nuts and acorns should be floated in a tub of water. The nuts

that float should be discarded and only the good seed that are heavy enough to sink should be planted. This kind of a planting is best done by a sharp stick, the handle of a broom or something similar and the acorn or nut dropped into the holes and the holes pressed firmly closed by pressing firmly on it with the heel.

SOIL EROSION AND SOIL EROSION CONTROL PLANTINGS

Before explaining the methods and procedure of erosion control plantings, it might be well to refresh our minds as to the causes and seriousness of soil erosion. Almost invariably soil erosion is caused by the ignorance or carelessness. In most cases it can be avoided. One of the largest factors is the improper cultivation of lands. Soil erosion invariably results when a field is plowed and cultivated "up and down the hill". Such fields should always be plowed and cultivated on the contours. If there is sufficient vegetation of grass, trees and shrubs there will be no erosion on practically any soil. The destruction of such vegetation by fire is a very serious factor. The overgrazing of pastures and woodlands is another very large cause of erosion. In a forest containing a normal amount of reproduction thus providing a litter of leaves, twigs, etc., on the ground, it is found that the humus material, that is the decayed leaves, twigs, etc., will absorb twice its own weight or 200 percent of its weight in water while sand will absorb 25 percent of its weight in water for a short period of time. It can readily be seen then that anything which will destroy the humus and leaf litter is of extreme importance in erosion control, since humus does not permit a rapid run-off of surface water. It is useful from an erosion standpoint. In addition to the retarding of rapid run-off of surface water there is a very large loss of food material from the soil as the layers of organic material in any soil are very close to the surface of the ground. This loss of food material from soil erosion is easily estimated as 20 times the loss in food material that is used in producing crops. It can readily be seen that of all the conservation problems in the state at the present time soil erosion and forest fires are by far the more serious as they threaten to destroy the productive condition of the soil if prompt measures are not taken. This includes, of course, the bottom lands which are covered with silt as well as the uplands which are fast becoming a mass of gullies. Erosion control planting can not expect to derive much profits with the exceptions of posts cut from black locust which can be planted on eroded land. The usual procedure in planting of erosion is to first lay brush in the bottoms of the gullies, pegging it down with stakes or to lay some slab or board dams across the gullies, then to knock off the sharper points of the gullies so that the dirt will lodge behind the dams. It is then possible for a man to start at the bottom of each gully and space the trees on the sides of the gullies, being careful not to place them where they will be washed out by the rains. Trees should be spaced about 3 to 4 feet apart and should be planted deeper than the old ground level of the trees so that they will not easily be washed out. In the planting of commonly called gullies the trees should be spaced about 4 x 4 and need not be planted much deeper than the original ground level of the trees.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

LAND CLASSIFICATION LAW

As the settlers started penetrating this wilderness, their chief aim was to establish farms to raise the necessities of life. Land had to be cleared. There was far too much timber for their own consumption. After they had used as much as they could, or needed, their only recourse was to burn the remainder. Slowly the forest was broken up into patches of timber. More and more land was cleared for farms.

FIRST CLASSIFICATION LAW

In 1899, there still remained eighteen million acres of timber in Indiana. At that time, the first Forest Reservation Act was passed, but without appropriations for administration. Consequently, few acres came into classification. After several revisions during the course of the next few years, the present law was arrived at. Now there are less than five million acres of wood lots left. The average size of each is about ten acres.

The problem has now changed from large tracts of timber under few owners to one of many small tracts under hundreds of owners. You may well ask: "If this is all the timber, why bother with it?" Despite seemingly low acreage of timber remaining, there is still an average of 190,000,000 board feet of timber cut each year in this State which is valued at three million dollars.

NEED OF WOOLANDS

The wood-using industries of Indiana employ thirty-five thousand people. This figure covers only those that use wood entirely in the manufacture of their products. Such industries that use wood and other materials are not included. Therefore, the small wood-lots are important to the State for industry, employment, and financial gain. These benefits do not take into consideration other values of forests which have been mentioned by other speakers.

Since we are dealing with property owners whose main concern is to make every acre productive, you will see why a law was necessary to encourage them to maintain their woods that timber would not disappear from this State.

TYPES OF TAXES

Timber is a crop, just as any other plant that a farmer raises from the soil. The difference between trees and a crop of corn, or wheat, is the length of time necessary to reach a marketable age. Under the old tax laws, the owner had to pay taxes on his woods for twenty or thirty years at the same rate of assessment as his corn field. Consequently, at the end of such a period, he realized no profit from his timber. It had all been eaten up by taxes. Yet a cut in taxes for timberland will not adjust the problem entirely, as governing expenses of the county, State, and Federal governments, must be met and to cut taxes on woodlands would only mean raising taxes on other land. Some states have used what is called a yield, or income, tax. The owner pays taxes according to the income at the time of cutting. Other states have a combination of the General Property tax and the yield tax. Basically, this is what makes up our present law.

LAW

Following is the law in common terms. You may read the law in the pamphlet at hand for the technical wording, if desired.

Sec. 1. Be it enacted by the General Assembly of this State, that for the purpose of taxation, certain forest lands, here-in-after defined as forest plantations and native forest lands, shall be classified and assessed as provided for in this act.

DEFINITION OF TERMS

The term, forest plantation, shall mean any piece of cleared land which has been regularly planted and has growing thereon, timber producing trees. The term, native forest land, shall mean any piece of land which has never been plowed, or cultivated, and which contains native timber producing trees.

NUMBER OF TREES REQUIRED

Sec. 2. Any piece of land to be classified under this law shall have growing thereon, certain number of healthy living trees per acre, depending upon the age of the trees. The exact number of trees for each age per acre is not to be given here as you may refer to it later. In the event that an owner has not the prescribed number of trees growing per acre, it is required that he shall plant such areas within three years of the date on which such land was entered for classification.

If a tree dies, or is removed, the vacancy shall be filled by planting seeds or seedlings. Trees planted shall be spaced not over eight feet apart. In counting the number of trees per acre, coppice shoots shall be counted as one for each stump. The following trees shall not be counted as timber trees: Dog-wood, water beech, ironwood, red bud, sassafras, persimmon, paw paw, black haw, and willow. The minimum stand of trees shall be regulated by the State Forester and his instructions and decisions in regard to what constitutes a stand of trees within the meaning of the act shall be final.

RATE

Sec. 3. All forest plantations and native forest lands shall be assessed at the rate of one dollar per acre.

METHOD OF ENTERING LAND

Sec. 4. Any person, firm, or corporation, which wishes to have land classified, may obtain applications from the State Forester's Office, or from the District Forester's Offices. After receiving the application blanks, the applicant shall have the land classified by metes and bounds, and located with reference to some established corner. The land shall be located as to Section, Township, Range, and County. The applicant must then have the land appraised by the township assessor for the township in which the land lies, and this appraisal shall become a part of the application and the Township Assessor shall sign the appraisement as specified in the act. If, in the judgement

of the State Forester, the application of the land to be classified complies with the provisions and intent of this act, the County Auditor is notified that the land described has been duly classified and the auditor shall enter the land for taxation as provided.

SURVEY CHARGES

Sec. 5. The county surveyor, or any other registered surveyor, shall not charge more than the legal rate for land surveys of a similar character.

Sec. 6. Any land designed for classification shall be appraised at its true cash value, which includes an mineral, stone, oil, or gas values it may have. The standing timber shall not be considered in the appraisement.

Sec. 7. The expense of this survey shall be borne by the applicant.

SIZE

Sec. 8. Land, to be classified, must contain at least three acres or more.

Sec. 9. Land to be classified must have no dwellings or buildings located on it. A saw mill or a sugar camp may be placed on the land in order that the owner may utilize such products. The reason no buildings are permitted on classified land is to prevent owners of cottages in woodlands about lakes and owners of suburban homes from classifying their lands.

GRAZING

Sec. 10. No classified land may be grazed by any domestic animal. This sometimes necessitates building of fences, especially in situations where stock from neighboring fields might wander into the woods.

DAMAGES FROM GRAZING

The young seedlings in a woods are stripped of their foliage and sometimes killed. The ground is packed causing a loss in moisture-content. Rain falling on packed soil does not penetrate to any great extent and the larger portion of it is lost in runoff. The loss in moisture-content and the packing of the soil naturally results in a slower rate of growth. Larger trees are commonly injured by stock rubbing against them. The bark is knocked off, allowing entrance places for insects and disease. The trampling of stock around the base of the trees exposes the roots to the air. If a woods is consistently grazed, or over-grazed, gradually all reproduction is killed, and the growth rate is practically at a standstill. The vitality of the trees is lowered by the loss in soil-moisture and the resistance to disease and insects is reduced. In other words, the woods is deteriorating and the owner can expect no profit in the near future. For these reasons, grazing is not permitted on classified forest land.

Many times a farmer will not classify because of this point, and yet researches by experts in grazing, and the state university of Purdue, say that it is not economically feasible to graze stock in a woods. The quality and quantity of meat is lowered and the general condition of the animals is reduced. In a well-managed woods, there is not sufficient grass to support stock. Grass and leaves do not go together.

SALE

Sec. 11. In the sale, or conveyance, of classified lands, the new owner, or any other person acquiring an interest in the lands, shall be bound by the same provisions of this act as the original owner.

Sec. 12. All classified land shall have signs placed along the boundaries so that they may be seen by the public. These signs are designed and furnished by the Department. This calls the attention of the public to a properly managed wood-lot and also makes it possible for an enforcement officer of the Department to discover violations of the act.

Sec. 13. In the event that any oil, gas, stone, coal, or other mineral is obtained from a classified forest, the area may be at once assessed for these products and placed on the tax duplicate.

Sec. 14. Should an owner of a classified forest desire to do some operation on his land, he may obtain permission from the State Forester's Office, if it is not inconsistent with good forest management or with the provisions of this act.

INSPECTIONS

Sec. 15. Each classified forest may be inspected at any time by the State Forester or his representatives. It is advantageous to have the owner go over the woods with the inspector. In this way various suggestions and corrections can be made to the owner regarding the woods. Each inspection of a woods is written and submitted to the owner. Another copy is filed as a permanent record in the State Forester's Office.

WITHDRAWAL

Sec. 16. Classified land may be withdrawn from classification at any time. All that is required is that the owner send in to the State Forester's Office the withdrawal blanks properly filled out and have the property appraised in the same manner as it was when classified. The standing timber at this time shall not be considered in the appraisement. If such an appraisement, as made by the township assessor is not satisfactory to the owner, a board consisting of the assessor, county auditor, and the treasurer of the county shall decide the case. Their decision is final.

INCREMENT TAXES

Sec. 17. When classified land is withdrawn, the owner of such land must pay an unearned increment tax. The sum of this tax shall be the sum of the last appraisement less the sum of the first appraisement. The reason for this section is that land classified is practically exempt from the burden of public improvements such as roads, bridges, schools, etc., which increase the value of the land. Supposing a real estate firm bought a tract of land within the limits of a town or adjacent to those limits and had the land classified. During the course of a few years, it is very probable that the town would build additions surrounding this tract and put in streets, sewers, water and light. Obviously the value of this classified tract would have increased greatly and yet they took no part in the cost of these improvements. The real estate company could withdraw this land, sub-divide it into lots and realize a large profit. For that reason, such land is rejected for classification.

Muck land, which is not forest land, is also rejected because of its usually high value as farm land. To date there has been no land where the unearned increment tax had to be paid. This is due to the judicial judgment of the inspectors in the State Forester's Office in the selection of the land to be classified. It is necessary and just that this section should be in the law and that it be clearly understood by everyone who desires their land inspected and classified.

FORCED WITHDRAWAL

Sec. 18. If the State Forester's Office finds that the provisions of this act are not being carried out and the owner, upon request, refuses to comply, the State Forester's Office shall file a withdrawal notice with the County Auditor and the owner. The procedure for withdrawal of this kind is the same as that outlined in Section 16. Grazing, burning the woods, or indiscriminate cutting, are some practices which would call for the withdrawal of the land. In case the owner is not able to pay the increment tax, such tax will take the same course as delinquent taxes.

YEARLY REPORT FOR COOPERATION

Sec. 19. The owner of a classified forest must report once each year to the State Forester's Office on blanks to be furnished by that Office. These written reports cover the condition of the woodland and suggested plans for future management. The State Forester's Office desires to cooperate to its fullest ability with the owners to see that the greatest returns are made to the owner. From these written reports (by the owner) and the inspection reports (by the State Forester's Office) recommendations on forestry practices can be made and carried out. It is from these written reports that the State Forestry Office ascertains whether such recommendations are followed. Some of these practices might be the cutting of wolf, or over-mature trees, in order that room might be allowed for reproduction, and possibly

there has been an insect attack which has killed several trees. Obviously, these trees should be removed for sanitation. Some of the woods might need reinforcement with better species of trees so that planting is necessary; and again, possibly the first crop is ready to be cut into ties, posts, lumber, or other products.

PRICES OF NURSERY STOCK

For the farmer, or land owner, to purchase a sufficient number of trees to stock several acres would be prohibitive from a monetary standpoint. The State, therefore, maintains nurseries which distribute seedlings at cost, for the purpose of reforesting land and windbreaks. Black locust are furnished at two dollars and a half a thousand; Hardwoods, five dollars a thousand; and conifers ten dollars a thousand. These trees cannot be used for landscaping nor ornamental purposes. In order to obtain this stock, it is only necessary to write to the State Forester's Office for order blanks. The Office will also give any recommendations or information that might be desired by the prospective planter.

BENEFITS UNDER LAND LAW

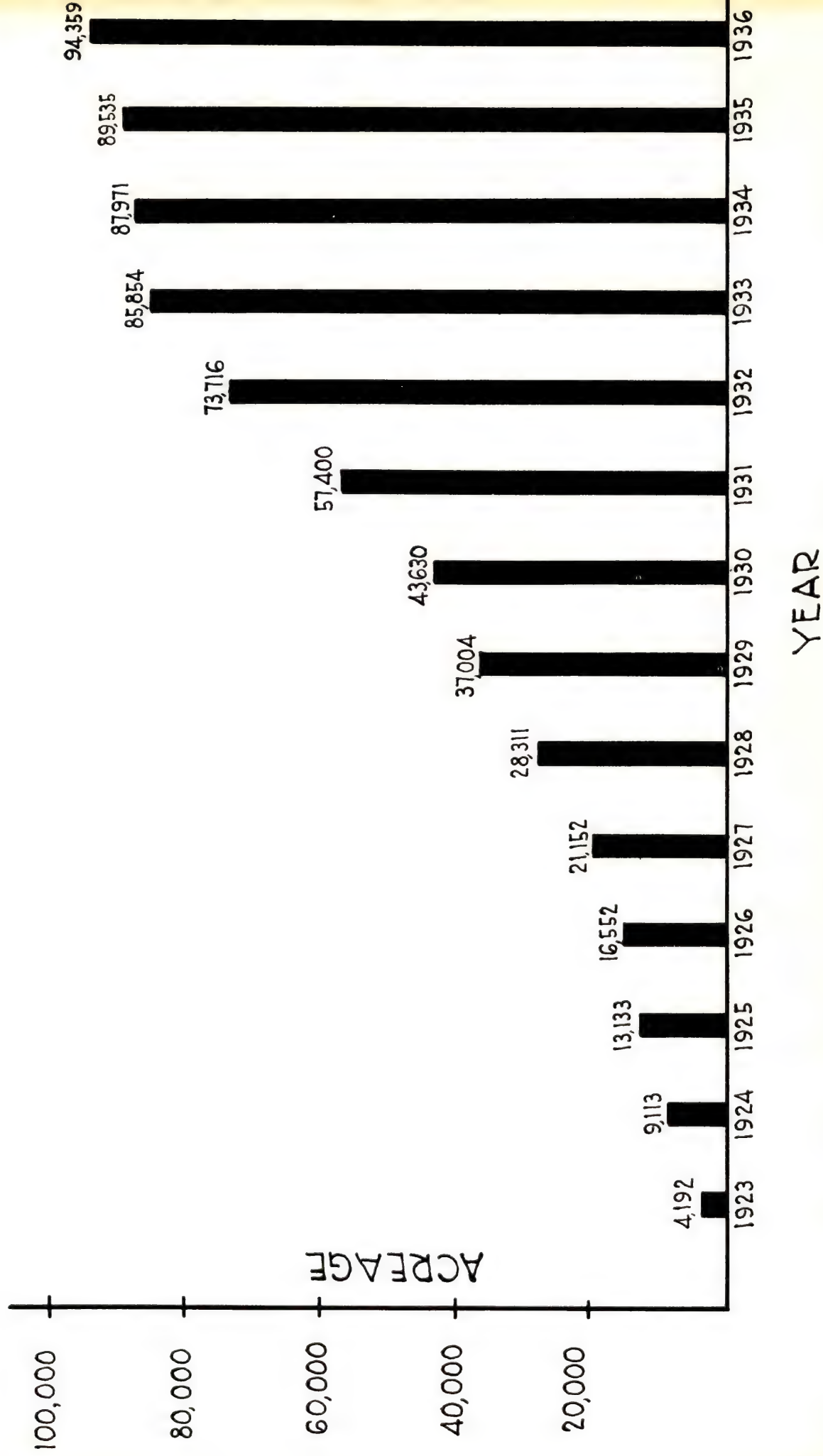
At this time, there are one thousand five hundred and fifty classified tracts, a total of ninety-four thousand three hundred fifty-nine acres. Now to enumerate the advantages to the owner of a classified woods. He lessens his taxes, so that in a long period of time he can make a profit from his timber. His woods are permanently productive under this law because the reproduction is protected.

He derives an annual and permanent income in the form of fire wood, fence posts, etc. The quality and quantity is improved.

Taking these classified owners as a group, they contribute tremendous benefits to the State which indirectly benefits all in return. Indiana has permanent forests which are protected from fire and grazing for game. The same cover also conserves water and prevents the disastrous results of erosion. Fire damage is lessened by the united efforts of these owners scattered throughout the State. Forestry principles are inculcated into the minds of a large number of the people. This in time will reflect in more and better timber. Denuded areas are planted and made more productive. This work is generally on land that would, in the future, necessitate planting by the State or Federal Government in order to keep it from becoming waste land. Thus a saving is made to the State and much time and labor can be spent on land that has been heretofore allowed to waste away.

Lastly, the State, and by the State is meant the people, is assured of a permanent timber supply with all the benefits that accrue with timber.

CLASSIFIED ACREAGE BY YEARS



STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

THE RELATION OF RESEARCH TO FISHERIES

(By Dr. Will Scott, Professor of
Zoology and Director of the Winona
Biological Station, Indiana University,
Bloomington, Indiana)

A man in a fish and game club once said to me, "All I want to know about fish is where they are and how to get them." That is a question that could have been asked properly in pioneer days when there were few people and a large natural supply of fish. The number of fishermen, however, has increased until fishing has become the most important sport in our country with the consequence that the number of fish is diminishing. More people engage in this sport and more money is invested in it than in any other outdoor recreation. It contributes health, wholesome enjoyment, mental recuperation and a considerable amount of food to its votaries.

To maintain this resource requires an increasing rather than a diminishing supply.

For some time we have assumed that the more fry and fingerlings we put into a lake or stream, the more adult fish we would be able to take out. We have long since learned that there is more to agriculture than planting grain. We are just beginning to see that there are many things we must know before our natural waters can be brought to their maximum productivity.

How many eggs do our various fishes lay? Just what are the things which destroy most of our young fish during their first year? What do the different fishes eat and how much? How many pounds of food does it take to make a pound of fish? What influence does temperature have on this?

Bass eat, among other things, minnows and young fish. These minnows eat small crustacea, insect larvae, and the like. These small organisms live on still smaller organisms, many of which are one-celled. Some live on the "ooze" at the bottom of lakes and streams or on aquatic plants.

How fast do these various things grow? How long do they live? How rapidly do they reproduce? Under what conditions does each live best?

Then there is the whole question of oxygen and other dissolved gases. Sewage does most of its harm to fishes by simply using up the oxygen. In this rich organic material "pond scums" (one-celled plants) begin to grow. These produce oxygen which changes ammonia to nitrates which in turn causes more plants to grow in the water. Finally there is oxygen to spare and the small animals begin to appear, and then the insect larvae, snails, minnows, and finally the catfish and bass. We will always have some effects of sewage. The problem is to avoid, as much as possible, the bad effects and utilize, insofar as we can, the ultimate good effects.

These are just a few of the many things we need to know about our waters.

Various people are working on different aspects of these problems in many parts of the world. The published results are voluminous. In order to avoid duplication of effort and to profit

from the work of others, adequate library facilities become a necessity. The work also requires men trained in biology in its broadest sense, in chemistry, and especially in limnology, which is the study of inland waters in all their aspects.

If a state university has a department with some vital interest in freshwater biology and has built up sufficient library facilities, then the linking of the division of fish and game with its state university is an efficient and economical procedure.

If such a relation existed between the fish and game departments and the university in each state, and if the departments regularly contributed three to five per cent of their income to the investigation of fundamental problems and the publication of the conclusion, the combined result would bring us much sooner to effective procedure in the management of our lakes and streams.

It is admittedly slow and laborious, but it is another case of the longest way round is the shortest way through.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

Fish---Their Distribution and Concentration.

Most of the important species of Indiana game fish are distributed generally throughout the state. There are exceptions to this general rule, however. The natural range of the red-eared sunfish seems to have been limited; the big catfish are found only in southern Indiana; the hackleback sturgeon is found only in the Ohio tributaries, including the Wabash and its larger tributaries; the spotted black bass is found in the southern two-thirds of the state; and the brook trout, if a native of the state at all, was found only in a few of the streams entering Lake Michigan.

Taking the state generally we may say that the largemouth black bass, smallmouth black bass, rock bass, bullhead, bluegill, two species of crappies, and many other fishes, such as suckers and a hundred species of minnows, are found in all parts of it.

The smallmouth is a stream fish, as a rule, and will be found, generally, over hard bottoms, such as gravel or stone. In some of the northern Indiana lakes, however, where there are extensive gravel bars, the smallmouth does well and is a native fish.

The largemouth is a still-water fish. It inhabits all of the northern lakes and some of the southern bayous.

The rock bass requires a hard bottom in either stream or lake, but the bluegill survives over mud, marl, silt, loam or muck as well as sand and gravel.

The black crappie is a pond fish; the white crappie is a stream fish.

In all kinds of waters and over all bottoms, excepting pure sand, minnows and suckers of one species or another will be found.

The trout--brook, brown and rainbow--have been planted in cool streams of northern Indiana and in some of the very cold streams of southern Indiana, especially those coming out of caves. The range of the trout always will be limited, and whether it will reproduce in any of our waters is still a question though evidence has been found that it may be spawning and reproducing. At any rate, the trout will provide some fishing during the season closed for bass and bluegills.

The spotted bass is a southern fish and one authority says it seems to like streams in the sandstone region. In Indiana, however, it seems as abundant over limestone and its range seems to extend entirely up the Wabash river. It is likely that nearly all of the so-called largemouth caught from Indiana streams are really spotted bass and are more closely related to the smallmouth than to the largemouth. We have never heard of a spotted bass being taken from our glacial lakes, however.

Ring perch are a typical northern fish, but it seems that in a case or two they have survived in southern Indiana ponds. Experiments are now in progress to determine whether they will spawn in lakes in southern Indiana.

The wall-eye is regarded as a northern fish, but they are also found in the large streams of southern Indiana along with the sauger. The sauger is very similar to the wall-eye and is a typically southern and central Indiana fish, abundant in the larger streams.

The northern pike is one of the best game fish in the state, very voracious, very game, and fully competent to dance on his tail if hooked with light tackle. It will strike bass bugs, plugs, spinners and spoons. It is a northern fish, native to both lakes and streams.

The muskellunge is found only in southern Indiana, and is the Ohio type of this fish. The northern tiger-striped musky is not found in this state. Muskies are reported from larger streams in Harrison, Crawford and Lawrence counties.

Channel catfish of the forked-tailed, spotted kind are found only in streams in Indiana. In Ohio they do well in some of the reservoirs.

Other species of channel catfish provide sport and excitement in southern Indiana, some of these fish weighing more than 100 pounds. They are very gamey, but are found only in the larger streams. The catfishes of Indiana deserve a great deal more scientific study than has been given them. Most of them are delicious food fishes, nearly all of them are game, and fishing for them as sport is becoming more general.

All of these fish and all other forms of water life will be found concentrated where there is plenty of oxygen, an absence of poison, and where food is abundant.

How Fish Might Be Grouped.

For our purposes, we may classify the fishes in groups as follows:

1. The sunfishes, which include the black basses, rock bass, crappies, bluegills, red-ears, long-eared sunfish, war-mouth, green sunfish and others. This is the most important game-fish group in Indiana.

2. The Sea bass group, which includes the white bass and yellow bass, which are cousins to the striped bass of the ocean.

3. The Perch group, which includes the very popular ring perch, the wall-eye, the sauger, and the little johnny darters you find in streams and lakes.

4. The Pike group, which includes the muskellunge, the northern pike, and the pickerel.

5. The Trout group, which includes brook, brown and rainbow trout, the cisco and white fish.

6. The Minnow and Sucker group, which includes the carp, redhorse, and many other fishes.

7. The Catfish group, which includes catfish from the tiny lady cat of our streams to big 100-pounders.

8. The Other Fish group, including such fish as gar, dogfish, shad and lampreys, which seem useless but which, on further investigation, may be found filling a very important place in the balance of life.

Sunfish Family.

Of this general group, the black basses are so important that they will be considered separate from the other sunfish. So, for the purposes of this lecture, we will consider the smaller members of the group. We shall not attempt to go into the scientific names of these fish, because these names usually mean little to us; some of such names are neither Latin nor Greek but plain North American Indian; and such names are changing rapidly, the bluegill having had three scientific names in two years.

Most popular of all the sunfishes is the bluegill. It is also one of the largest of the family, excepting only the black basses. The bluegill grows to nearly two pounds in weight, but normally a good-sized bluegill would be one 8 inches long. Bluegills will change in color with their environment, as will most other fish. The bluegill is a flat fish, with smallmouth, its "ear" being a very dark blue or black; with bars, sometimes very indistinct, running across the side of the body up and down; with or without copper color on the belly; sometimes with the sides pale; often with a purplish lustre. There are 10 spines in the dorsal or back fin, and the back fin is all in one piece, not divided. There is always a black blotch at the rear of the dorsal fin.

The red-eared sunfish is easily recognized by its "ear", which has a red or pink margin entirely around it. Little seems to be known about it outside Indiana, but in this state it is one of the most popular of pan fish and Indiana seems

to be the only state that propagates it. Old text books say it grows to 6 or 7 inches, but red-ears have been caught that weighed well over a pound. It is a very game fish, fully as game as a bluegill, and like the bluegill will take artificial as well as natural bait.

One of the most popular sunfishes is the rock bass, known also as the red-eye and goggle-eye. It seems to grow larger or more rapidly in southern Indiana than in the northern and central parts of the state. As fly fishing increases, the demands for rock bass also increase, as it will rise to an artificial fly. The rock bass grows to nearly two pounds in weight, but the average for northern Indiana is only a few ounces and for southern Indiana the average probably will not exceed a quarter of a pound. The fish is rather flat and wide, but not so flat as a bluegill. It is rather thick. The head, mouth, and the eye are large and the eye is blotched with red. In color the rock bass is greenish and brassy with dark blotches. Each scale has a dark spot on it. The spines of the dorsal fin are rather low. The rock bass feels firm to the touch, whereas the warmouth feels flabby and soft.

The warmouth, known also as warmouth bass and mud bass, is a smaller fish than the rock bass, probably never being more than 7 or 8 inches long in Indiana. It is soft and flabby when handled. In color it is brownish and sometimes brick-red, with a dark yellow or brassy-colored belly. The warmouth likes mud bottoms and old logs and stumps. This fish will take artificial lures very readily.

The two crappies are often found in the same waters. Both are rather soft fish and not good fighters though often taken on artificial lures. The black crappie is often called the calico bass, and is likely to be found in lakes and ponds. The white crappie is lighter in color, sometimes almost silvery, and is a fish of the streams, being found about old stumps, big boulders and in eddies. Both are very destructive to other fish and both have large mouths. Both are flat fishes and they are not so thick as a bluegill. Both take artificial lures and both grow to a weight of more than a pound and a length of more than 14 inches. The black crappie is a silvery olive color with mottles of greenish color over the whole body. This fish has 7 and sometimes 8 spines in the dorsal fin. The white crappie is silvery with darker greenish blotches, and has 5 or, usually, 6 spines in the dorsal fin. A characteristic of these two fishes is that the anal fin and dorsal fin are of practically the same size.

The common sunfish and long-eared sunfish are two very colorful members of the family and, for their size, very game. They are excellently flavored, and if only larger, would be popular with the grown-up angler. The writer of this lecture knows a 200-pound man who buys No. 14 hooks and a spool of silk thread; goes to a stream and cuts a willow switch; and baiting his hook with a pinch of angle worm, fishes for common

sunfish and declares it great sport. The long-eared sunfish will be recognized by its long ear. The common sunfish is a brilliantly colored, small sunfish of streams and lakes and needs no detailed description.

The green sunfish is a large-mouthed member of the group, very game and very destructive to other fish. Though soft to the touch when caught, its flesh is good food and it grows to a size of possibly 7 or 8 inches in Indiana. A green sunfish only 4 inches long will often be caught on a No. 1-0 bass bug. The green sunfish has a dirty green color. Its mouth is very large. Down its face will be found zigzag lines of light blue, which are characteristic of this fish. Though the text books say it is not common in lakes, there are many Indiana lakes where it is found. For example, it will be taken from the stumps on Lake Wawasee, largest lake in the state. It also will be found very plentiful in some of the Indian Village lakes.

In Lake Wawasee and other lakes are other species of sunfish, or, perhaps, large strains of the common sunfish. These are not so commonly caught as the bluegill or red-ear and they are the most brilliantly colored fish in the lake. It is known that sunfish will hybridize and possibly these fish are hybrids or mixtures of two species of sunfish and can not reproduce. The sunfishes deserve further careful study by scientists, and if the large sunfish are not hybrids they deserve some careful study with a view to extending their range.

Sea Basses

The true basses are the striped bass of the ocean and its fresh-water kindred. In Indiana we have the silver bass, known in other states as the yellow bass, and we also have the white bass. These two fish look very much alike, but the silver bass gets larger than the white bass. They are good game fish and are often found in great numbers in both lakes and streams. The silver bass grows to 3 pounds in weight and 18 inches long or more and the white bass reaches a size slightly smaller. The average catch of white bass, however, will go less than a pound.

The silver or yellow bass is rather common in the Tippecanoe River and connecting lakes, such as Lake Tippecanoe, and in recent years has been common in Lakes Freeman and Shaffer, which are created in the Tippecanoe River by power dams. The color is a brassy silver, the brassy tinge giving the name of yellow bass and the silver sheen of the fish giving the common Indiana name of silver bass. Along the sides are distinct, black, longitudinal lines. Toward the tail of the fish, these lines are broken or interrupted. The fish is rather flat, tends to be thin, and is wide, and the back is arched. The mouth is medium and the head is pointed.

The white bass is a silvery fish, shaped like the silver bass, but with the lines along the side less distinct. The lines, however, are broken or interrupted toward the tail. There are five of these lines above the lateral line, one line along the lateral line and other lines below the lateral line, but those below the lateral vary in number.

Perch Group

You can know a perch by its general shape, the body being arched and the belly extending almost in a straight line. Most of the body is above the line from mouth to tail. There are three species of this group that are of particular interest to wardens: the wall-eye, the sauger and the ring perch or yellow perch.

The wall-eye is a native of Indiana but has been greatly extended in range by planting of fry obtained from wall-eye eggs from Saginaw Bay of Lake Huron. The wall-eye is the largest of the group and grows to 3 feet long and a weight of 25 pounds but a weight of 3 pounds is a large fish in any water. It is a commercial fish and is sold on the market legally, and it is netted from the Great Lakes in large numbers, but in our inland waters it is a protected fish. It is very voracious and other game fish do not thrive well, ordinarily, where the wall-eye is numerous. As a game fish it ranks low, and it does not put up a good fight for its size and weight, but as a food fish it is in the highest class.

In color this fish is a dark olive, with brassy reflections and with mottles of fine brassy color; sides of the head vermiculated; dorsal fin without black spots but with a black blotch on the membrane of the last two or three spines. The color, however, varies. The dorsal fin is distinctly separated into two parts with a space between.

The sauger or sand pike is a much smaller fish but looks much like the pike-perch. It may be distinguished from the wall-eye by the black dots on its dorsal fin. On the first division of the dorsal are two or three rows of round black spots and on the second part are three rows of black dots that are irregularly spaced. The general color is grayish but it is blotched with other color much like the wall-eye.

The sauger is a good food fish and also is voracious, but as it does not grow so large as the wall-eye is not so destructive of the larger fish as is the wall-eye. The Wabash River and many of its tributaries contain saugers.

The ring perch or yellow perch is the smallest member of the group, so far as sport fishing is concerned. It is so common that a detailed description does not seem necessary, but it has the usual perch shape with most of the body above a line from mouth to tail and the back is arched. It has a divided dorsal fin. The general color is yellow or golden, and there are six to eight darker bars going around the body like rings, giving it its common Indiana name of ring perch. In some specimens these rings may be almost lacking. In spawning season the fins may be red.

The perch sometimes gets large and the writer has seen one

Fish - 7.

strike a large bass plug on Webster Lake. In most lakes, however, the perch average very small and there seem to be strains of these fish that never get large. For this reason an effort has been under way to get a stock of a larger strain of fish and to permit the little ones to be caught and kept.

Ordinarily the ring perch bites on natural bait. Most of them are taken on angle worms but small minnows are excellent bait. They are a voracious fish and probably eat millions of fry of other fish, but as they do not get large they do not eat the larger fish.

The ring perch is a commercial fish and is taken in nets from the Great Lakes and sold on the market legally. It is one of the most delicious of all food fishes and ranks close to the trout. Many say it is better than the bluegill or any of the sunfish group.

There are other perch in Indiana, but they are small and not sport or food fishes. One of these is called the log perch and others are the little darters often caught when seining for minnows. They are all slender fish with the general perch shape and with fins like the other fishes. Their colors are brilliant and range from browns and tans to brilliant greens and reds. Their size varies from an inch or two up to half a foot or more.

Pike Family.

The pike family is a group of very important fish, including some that are very gamey. In Indiana we have three members of the family: The muskellunge, the northern pike and the vermiculated pickerel.

The muskellunges include the northern, tiger-striped fish. This is not found in Indiana. The one found in Indiana is the Ohio musky, which is not tiger-striped. It is a very gamey fish and is found in tributaries entering the Ohio River, and in some streams leading off from these tributaries. Blue River, Little Blue, White River and even tributaries of the East Fork of the White contain muskies.

The musky has scales only on the upper part of its cheek. The northern pike has scales over all of the cheek and upper part of the opercle. The pickerels have both the cheeks and opercles entirely scaled. The opercle is triangular shaped and is just back of the cheek. It is easy to remember about these scales, like this: The pickerel is little; so it needs more scales on its head. The northern pike is larger and has fewer scales. The musky is largest of all; so it has fewer scales than any of them.

The pike or northern pike is one of the most important fishes in Indiana. It is very gamey and is very good food.

It will strike on almost any kind of artificial lure and the writer of this lecture has taken it on bass bugs though the largest ones so hooked always bit through the leader and got away. Trolling is a very common way of fishing for it. If this big fish could be advertised more, it would bring thousands of dollars to the owners of boat liveries. It does eat many other fish, but it also eats frogs, insect larvae, insects and probably birds that swoop down to the water. It can not be emphasized too much that one of the best ways of catching it is to use a large spoon or spinner and troll from a slow-moving boat, in the deeper water in summer time, and often just off the break of the lakes. In streams a good way is to fish for it in the fall, on a cold, blustery day, even in the rain or snow, using a fly rod and about a No. 2 $\frac{1}{2}$ or 3 spinner.

All the pike family have one peculiarity that is very noticable, The back is almost entirely bare. You find the dorsal fin set far to the rear. Under the dorsal fin is the anal fin, which is practically the same size as the dorsal. In other words, so far as the dorsal and anal fin are concerned, you could turn the fish bottom-side-up and it would look the same.

The third member of the pike group in Indiana is one for which we will give you a Latin name--vermiculatus. There is nothing in this name for you to be afraid of. In Latin "verm" means "worm", and in Latin it is pronounced "worm" or "worm". The "latus" part of the name means "line", "trace" or "track". So the Latin word merely means "worm tracks". Now, if you will look for worm tracks on the back of a fish that looks like a northern pike, you will spot the Indiana pickerel every time. But, if the tracks should be indistinct, remember that this little fish will have its cheek and opercle scaled.

At this point it may be well to remark that the scientists had to give names of their own to all plants and animals because the average man would have a dozen different names for the same thing. For example, in parts of Michigan the pike is called a pickerel and the wall-eye is called a pike; in Kentucky the wall-eye is a jack-salmon and in parts of Canada it is a dore. But the scientist's Latin and Greek are not always Latin and Greek. The truth is that the scientist has lifted Algonquin Indian names and palmed them off on the public for classical language. For example, Masquinongy, which is the scientific name for musky, is an American Indian word meaning long-face. Our frank opinion is that the Indian had a better knack of naming things than the white man.

Getting back to the pickerel, these little fish are very voracious and should not be tolerated where too numerous. They are good food fishes but have many bones, some of them forked. The law is intended to protect the northern pike and not the true Indiana pickerel.

Trout Group.

In the trout group of fishes are the whitefish, cisco, salmon and trout. In Indiana we have cisco, possibly some whitefish, and three trouts, brook, brown and rainbow.

Most numerous of all of these fishes are the cisco. These fish are said to rise to a fly in early spring when in shallow water, but they go to deep waters in the summer and are not caught. For this reason fishermen have been permitted to take cisco in nets at the spawning time in the fall, but the spawn must be stripped and returned to the water.

Fishermen assert that there are both cisco and whitefish in some of the Indiana lakes. Many times, where the experience of fishermen did not agree with the investigations of scientists, the fishermen have been found to be correct about it. Many other times the fishermen themselves have been mistaken. It is probable, however, that the cisco of Indiana should be more carefully studied and that an investigation should be made to learn whether there are genuine whitefish in our lakes outside of Lake Michigan.

All of the trout group have an adipose fin. The adipose fin is a tiny chunk of meaty or fatty tissue on the rear of the back. The catfish also have this adipose fin, as a rule, but the catfish has no scales. Both cisco and trout, however, do have scales.

The cisco have an adipose fin. Sometimes golden shiners are caught in our Indiana lakes and called "cisco". But the golden shiner is a minnow and has a dorsal fin like a trout but has no adipose fin.

The cisco is a member of the whitefish group. It is a silvery fish, with small head and very small mouth. When you see a fish of this general type taken from an Indiana lake, if that fish has an adipose fin, you may call it a cisco.

The brook trout is reputed to have no scales, but it does have them. The scales are very fine, however. The brook trout can be easily distinguished from other trouts by the vermiculations on its back. Again you should remember that vermiculations are merely "worm tracks". No other trout has vermiculations. The brook trout's lower fins look as if some painter had caught it, used a fine brush and striped the front of the fins with pure white, and then turned the fish back into the water. It is spotted, some of the spots being the color of coals of fire. The brook trout comes from the East and North. It may always have inhabited the streams that flow out of Indiana springs into Lake Michigan or it may have been stocked there. It has been there for many years at least. In more recent years, the brook trout has been stocked in many other parts of the state, particularly along Pigeon and Fawn Rivers in northern Indiana. It also has survived in streams coming from the caves in Spring

Mill State Park in southern Indiana.

The rainbow trout is from the West. It is a silvery trout with a red streak longitudinally along the middle, and it is covered with black spots. The rainbow's head is rather small and its mouth is smaller than the brook trout's mouth. It is a very gamey fish, leaping from the water, whereas the brook trout never leaps except in taking the fly, when it sometimes leaps clear of the water. The rainbow can be distinguished by its black spots and by its streak of reddish color along the body. If you examine the inside of its mouth, you will find the roof of the mouth covered with zigzag teeth. The rainbow has been widely planted and has given a good account of itself in Indiana and many are caught every year.

The brown trout is from Europe. It is not so good a trout as either the brook or rainbow, but is still an excellent fish and very gamey. The general color of the brown trout is brownish, but it is spotted also, and the red spots on a brown trout are rather dull red or brick red and are never the "live" red that you will notice at once on a brook trout. The brown trout is generally a coarser fish than either the brook or rainbow. The spots on a brown trout are larger than those on a rainbow.

In the water you will know a brook trout by its vermiculations and the white streaks at the forward edge of the lower fins. You will know a rainbow by its silvery color if it leaps, and by its fine black spots and the bar of reddish color along the side. You will know a brown trout by its brownish color, its darkish colored spots and its generally lighter color.

Minnow Group.

Minnows are very definite kinds of fish, and any warden who calls a small black bass a "minnow" ought to be deprived of his cigarettes and coffee. A bass or a trout is always a bass or a trout from the time it is hatched until it dies and disappears. A minnow is always a minnow and it no more grows up to be a bass than a tiny cub bear is a mouse.

A minnow has no scales on its head. So we can say it is bald-headed. A minnow has a very simple dorsal fin, usually with about 8 rays. A minnow does not have a sucker mouth. If a bald-headed fish with a simple dorsal fin has a sucker mouth, it is not a minnow but a sucker. This is just a general rule for you looking at the outside of the fish. There is inside information about a minnow that we will not try to describe.

Most minnows are little fish, but not all of them. Some will weigh 40 pounds. The biggest minnow we have is the carp, which is not a native fish, but which has gone nearly everywhere and upset the fish balance.

Nearly all minnows are game, and there are more than 200 species in the United States, all of which have not been studied. There are very few members of the family that eat vegetable matter exclusively. Most of them are great feeders on insects and insect larvae and will rise to a small trout fly even more readily than a trout.

Catfish Family.

Catfishes have no scales and nearly all of them have adipose fins like trout. As we have grouped these fishes, however, all do not have this adipose fin; the lady cat or stone cat, a very tiny fish, being one example. This lady cat have a tail fin that grows around the tail, end, top and bottom. No serious fisherman ever fishes for them.

The bullheads are probably the most popular catfish. They are big-headed cats of minor size, some black or dark brown, some yellow, some brown, mottled with a sort of dirty greenish color. The black and yellow bullheads will be found in streams, and the yellow bullhead is in some lakes. The mottled catfish is found in the lakes. Taken from clear streams like the Tippecanoe River, bullheads are very good to eat.

Wherever they are found, the black-spotted channel catfish are the most popular of all, but their range is somewhat restricted and they are only in the larger streams, so that the common bullheads really take first place because they are found everywhere.

The spotted channel cat is really a beautiful fish; in fact, it is the aristocrat of the catfish family. It is a silvery fish, long and slender, with black spots sprinkled over it, and with a forked tail. It is a very game fish and delicious food fish, and may be taken on meat bait, crawfish, minnows, or artificial lures. It is distributed over the rivers that drain directly or indirectly into the Ohio, but it comes farther up the Wabash Valley than any other of the larger catfishes and is known even in northern Indiana. The ordinary size of a channel catfish will be about a foot or foot and a half long but it grows to twenty pounds or more.

There are three channel catfishes, the spotted channel, the blue or Mississippi catfish, and the eel cat or willow cat. The blue and eel catfish are not well known excepting in southern Indiana and from the larger rivers. The blue cat grows to be 100 pounds or more. The eel cat does not come so far north as the blue and the blue does not come so far north as the spotted channel. All are good food fishes. The eel cat and blue cat, however, are more commercial than sporting fish.

Most catfish, excepting the bullheads and lady cats, seem to be migratory. Experience seems to show that after high waters in the spring, catfishing is better; that after long periods of drought, fishing for catfish is not so good. Much

remains to be learned, however, about all of the catfish, and it may be expected that in the future, science will change or modify its classifications or find and add new species.

Other Fish.

Many other fish have not been mentioned and no attempt will be made to discuss them, but some will be noted briefly.

The buffalo fish are good American fish, and a part of the balance of life in many Indiana waters. They are closely related to the minnows and suckers.

The highfins or quillbacks are native fish and should not be exterminated, and are closely related to minnow and suckers.

The hickory shad eats vegetable matter and is a good forage fish for bass and northern pike. It is very important in our balance of fish life and should not be exterminated.

The Great Lakes sturgeon is nearly exterminated and deserves protection.

The common hackleback sturgeon of our rivers is a good food fish and often bites on bait on the bottom of the stream.

All of the suckers are good fish and should not be exterminated. They eat snails and too many snails are bad for game fish and will drive bluegills from their nests. Suckers are good forage fish for bass and pike.

The eel is a long, slender, cylindrical fish, which spawns in the ocean and migrates up the Mississippi and thence to Indiana.

The dogfish and gar are a part of the natural balance of fish life, but becomes so abundant over other fishes that their destruction may become serious. They are a very low order of fish. The dogfish is prized as food by a few and to them is known as the grindle.

The very lowest form of fish is the lamprey, which has a sucking mouth and a tongue that is very hard. It holds to other fish by its mouth and uses its tongue to bore a hole through scales. It then sucks the blood and juices from a fish. It is entirely a parasite.

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STRUCTURE OF FISH

It is easy to understand why no one knows all about fish. There are over 12,000 species of these vertebrates that live in the water, classified in some 200 families, and over 3300 of them inhabit the waters of North America. The number of species found in Indiana is around 200 which makes study very difficult. To identify the common domestic food species is fairly easy, but to know all their habits and peculiarities is too much to expect of other than scientists.

External Covering

You must know something of the anatomy of fish in order to identify them. With most fishes, the exception being catfish, spoonbills, sharks etc., the outside skeleton or protective covering consists of scales set in sockets in the skin. These scales grow with the fish, adding concentric layers or circuli to the outside as they become larger. Most of the rings are formed in the warm months during the growing period of the fish but as the growth slows down in the fall and practically ceases in the winter, the circuli become fewer and closer together. The winter rings or annuli indicate the year's growth and by counting them with a microscope, the age of the fish can be determined. The only uncertainty is due to the lack of definiteness of the rings on the scale examined.

Fish have a structure eminently suitable for life in the water. Their "stream-line" bodies offer little water resistance and the slipperyness formed by a secretion of mucus from cells in the skin, enables them to attain remarkable speed. The maximum speed of course varies with different species and is influenced by the water currents. Water is 778 times heavier than air and its buoyancy enables the fish to maintain its equilibrium with little effort.

Fins

The vertical fins, dorsal and anal, act as a keel in keeping the body upright. The swim-bladder, a closed air-filled sac found in the upper half of the stomach cavity, also helps. Since the back is the heaviest part of the fish, if it were not for the paired fins, pectoral and ventral, which serve as a rudder, balancer and brake, the body would turn over. Consequently, the paired fins are almost constantly in motion, even when the fish is resting and they often aid the fish in breathing by creating currents which draw water through the gills.

Fish are able to move forward and backward by bending and twisting the body with rhythmical muscular movements. These movements start at the anterior end and travel to the tail, making a propellor of the caudal fin. By changing the angle of the fins or by moving the fins on one side the fish changes its course, but it is easy to see that most of the motion of the fish is caused by the caudal fin.

Eyes

The eyes are so placed that a fish can see in two directions at the same time. Fish see things above the water but do not get a definite image of distant objects. The spherical lens in the eye makes a fish very nearsighted but the large pupil gathers sufficient light, so that they have clear vision of close objects and some species are able to distinguish certain colors, such as red, green and blue. Fish cannot cry; they do not have tear glands or eyelids, so, the eyes must always remain open even in rest periods. They do rest when the nerves are relaxed and fish sleep.

Growth & Food

Most fishes continue to grow as long as they live. Eating seems to be their only care and much of the life of a fish is spent in feeding. They do not taste or chew their food, in fact, fish taste only foods in solutions near at hand but can detect the presence of edible things in the water. In some of the species, the catfishes for example, food is located by feelers on the head that contain taste buds. These structures are also present in the mouth, on the skin, fins and eyes of bullheads. They can taste with almost any part of the body. The feelers are also touch organs which aid in the movements of the fish.

Nostrils

The four nostrils are situated in front of the eyes, on most fish, two on each side of the snout. These organs are not used for breathing; they do not connect with the mouth. At the bottom of each pair of nostrils is a sac. Water currents pass into the front opening, down over the sacs and out the posterior outlet. By means of these sacs fishes can detect very dilute solutions of chemical in the water even at considerable distance.

Hearing

Fish cannot "hear" as man does, they do not have an external ear and the internal ear is generally deficient. However, the skin is rather sensitive to vibrations and most fishes have lateral line organs which register vibrations that are much too low for the human ear to record. Through these organs and the skin a fish is able to locate currents, waves and ripples, which it swims against by instinct. These vibration organs also enable a fish to avoid unseen objects in the water.

Gill Cover

The opercle or gill cover is, as its name implies, a protective covering for the soft gills, the important breathing mechanism of the fish. This is an interesting feature but comes under the internal structure.

Color Changes

Color changes in fish are due, primarily, to color cells located in the skin or beneath the scales. These pigment cells are of various kinds- red, orange, yellow and blue, which expand, contract or unite under control of the eye and nervous system, to accomplish the desired results. The color of a fish changes with the mood or environment of the individual, excitement, food, light, temperature and courtship may affect a change, within certain limits.

Sex & Spawning

Unless you are an expert you probably cannot distinguish the male from the female from external appearances, as they both look alike, except, perhaps, just prior to spawning. During this period, for most fish May or early June in Indiana, the male is usually more brilliantly colored than the female. Every species of fish has a definite pattern and certain other distinctive features which help in identification, but it must be remembered that too much reliance should not be put on color.

At spawning time the pressure of the eggs suggests nesting to the female and the presence of the eggs tells the male to defend them until they hatch as the water grows warmer. The number of eggs often varies to a remarkable degree with the same species of fish. The eggs are generally smaller with small or young specimens and usually there are not so many. Active fishes who lack parental instinct lay a great many eggs, often into the millions.

Some fishes expell their eggs in a string or mass covered with a mucus and this becomes attached to aquatic vegetation or other objects, where it remains until the eggs hatch. The majority of domestic fishes are different, they deposit their eggs in a clump, in a nest and the male watches over the brood until the fry leave to forage for themselves.

Pain

Fishes suffer little if any pain when they are hooked, for there are very few nerves about the jaw which could cause that sensation. Some fish have actually been known to be hooked several times in the same day. Fish, no doubt, experience discomfort from being restrained of their liberty but any painful sensation would be slight compared with higher animals.

Fry - Minnow

When speaking of young fish the term "fry" or "fingerling" should be used. The name "minnow" does not mean a small fish but refers to all members of the Cyprinidae family, regardless of size. Young fish are called "fry" until they reach one inch in length when they are called "fingerlings" #1, and so forth, depending on the length. When fingerlings become one year old they are called "yearlings".

Observation of fish in their natural habitate is extremely difficult. Many problems remain unsolved and it probably will be some time before ichthyologists supply the missing data. Even if the facts were known, time does not permit lengthy details. Trying to separate the functions of the external and internal structures of a fish is likened to a spark plug on a motor that can be seen from the outside, but functions inside. It is only for the sake of clearness that such a procedure is used.

Skeletal System

The hard parts of a fish are composed of cartilage and bone. The principal bones are those of the head, backbone, ribs and supports for the fins. Like man, the backbone is composed of a series of small bones that are movable. For this reason a fish in swimming can bend its body either to the left or to the right.

Muscular

The muscles are used principally for locomotion, in obtaining food and in breathing. The swimming movements are produced by four longitudinal bands that are arranged in zig-zag bundles along both sides of the body.

Digestive System

Practically all fresh-water fishes feed primarily on aquatic animals, but a few species consume plants. In the gizzard shad the gill rakers are stiff, needle-like rods that are so close together they resemble a comb. The plants consumed are very small and this fine-toothed comb strains them from the water. In some cases the plants are so minute that it would take several thousand placed in a straight line to make one inch. Most of our game fishes, like the large and small-mouth black bass, are carnivorous and feed upon animals instead of plants. The food of these two species is explained in another paper.

The food of a fish is taken into the mouth, and in some forms like the pike and pike-perch, may be held by long sharp teeth. In others like the catfish, and suckers there are strong teeth in the region of the throat behind the gills, that crush the hard shells of such animals as mussels, snails and other hard bodied creatures.

The tongue is a flat gristle-like structure that cannot be independently moved, and is not used for tasting or making sounds.

From the mouth, the food enters a short tube that leads to the stomach. The food is partially digested in the stomach by means of digestive fluids secreted by gland cells in the stomach walls. The food then enters the intestine through a valve where digestion is completed. Short finger-like tubes called pyloric caecae open into the intestine. These blind tubes increase the absorptive and secreting surfaces. They are often mistaken for worms. The liver secretes the bile and this digestive juice is stored in the gall bladder at the posterior part of the liver. From here it enters the intestine through a tube. The undigested part of the food that is not acted on by the digestive juices passes out the anus.

Circulatory and Respiratory System

The blood vessels are filled with a red liquid called blood. The capillaries embedded in the walls of the intestine absorb the soluble food materials which are then carried to all parts of the body, burned up as they combine with oxygen, and serve as nourishment in building up the body tissues, and in supplying heat and energy for locomotion.

Oxygen is necessary for life. This gas is dissolved in the water in the free state, and fish are able to use it because of the presence of special structures called gills. Just beneath the gill cover on each side of the head will be found four bony rib-like gill arches. On the anterior surface of each arch are small tooth-like rods; these are called gill rakers and aid in straining food from the water. The soft gill filaments are found on the posterior surface of each gill arch. There are many pairs of pink filaments to each gill arch.

The water enters the open mouth as the gill covers expand and the posterior valves close. This operation fills the mouth cavity with water. The gill covers are now compressed, the anterior valves close and the posterior valves open. This forces the water backward over the gills. As the water bathes the gill filaments the carbon dioxide, a waste gas in the blood, is given off and oxygen, is taken up by the blood in the gill filaments. This is possible because of the presence of very minute blood vessels in the gill filaments called capillaries, that aid in the exchange of gases. For each gill arch there is a vein and an artery. Veins from all parts of the body carry the impure blood to the gills, and the arteries carry the pure blood to the various organs. The small capillaries serve as a medium of exchange between the two. The gills have an important relation to pollution but this point will be considered later.

The swim bladder is closely connected with respiration. It is a sac filled with gases, and may be divided into compartments. In some cases it is connected with the digestive system by a tube. This is true of the gar, carp, catfish and several others. These fishes come to the surface, gulp in air and a small amount enters the swim bladder. The air bladder may be used as a lung, for maintaining equilibrium, making sounds, storing oxygen and for receiving sounds. It contains three gases; nitrogen, oxygen and carbon dioxide. These gases enter the air sac, either through the tube previously mentioned or are derived from the blood.

In the yellow perch the oxygen in the air bladder aids in respiration. When the fish enters deep water, where this gas is deficient, it can remain for two hours due to the presence of a large amount of oxygen in the swim bladder.

Because of the extreme lightness of the air bladder, it helps to keep the fish in a horizontal position. The air bladder also regulates the specific gravity of the fish. Since the air bladder is elastic it will be smaller in deep water because of the greater pressure exerted; at the surface of the water less pressure is found and the air bladder tends to swell. This self-regulating mechanism is important in fishes that inhabit water of various depths because it enables them to displace their own weight of water. In the drum, and other species, the sounds produced are due to vibrations of the wall of the air bladder. These vibrations are produced by special muscles in connection with the air sac. In some fishes like the gar, suckers and catfishes, the air bladder is connected with the ear by a chain of bones and aids in hearing.

Reproductive System

Both sexes have the same organ systems, but the reproductive organs are modified and the sexes are separate. In the male the reproductive organs consist of a pair of testes that are flat white ribbon-like structures and lie between the digestive system and the swim bladder. The size depends upon the season. These structures produce the reproductive cells that are responsible for the fertilization of the eggs from the female. The milt containing the reproductive cells is discharged into the water through a small opening. Each reproductive cell is alive, motile and resembles a tadpole in shape, but is microscopic in size. Millions of such cells occur in the milt. In the nest building

fishes, especially those that protect the nest, practically all of the eggs are fertilized.

The female contains a pair of ovaries that vary in size, depending upon the stage of development of the eggs. The eggs are usually yellow in color and vary from $1/16$ " to $3/16$ " in diameter. During the spring spawning season the ovaries are very large, and may occupy most of the space inside the body. When ripe the eggs are deposited in a nest or a random in the water, this varies with the species.

Nervous System

This system is too complicated for a general paper on fishes. The brain, dorsal nerve cord and lateral nerves furnish the stimuli for all activities. A fish possesses only internal ears. The external and middle part are not present. Nevertheless, they are able to detect vibrations in the water. The sound waves in the water are carried by the bones of the head to the inner ear. The same results may be obtained by putting a watch between your teeth and holding your ears. Sounds made in the air do not penetrate the water to any depth and, therefore, are not perceived by fishes. The old saying, "Do not talk when you go fishing" is not based upon facts. The internal ears also enable the fish to balance itself in the water.

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Three Indiana Black Basses

Indiana contains the three black basses, which are the only three species of black bass so far known to science. Until ten years ago, science said there were only two species of black bass, the largemouth and smallmouth, and when the third species was announced many fishermen doubted the possibility. To-day, however, many fishermen are able to identify the third species, and it is much farther distributed than at first supposed.

Despite the discovery of the third species, however, the two kinds of black bass originally known are far the most important. The smallmouth is the most popular stream fish; the largemouth the most popular lake fish.

Smallmouth

The smallmouth is much different from the others. It is a fish of the streams and the lakes with good wave action and gravel or rocky shores. It is found entirely throughout Indiana where it has not been killed out by poisonous pollutions or silting. It is abundant in streams that cross the Michigan line, and abundant also in streams that flow into the Ohio river and it is very common even in the corn belt.

You will know the smallmouth at a glance by its smaller mouth. The mouth does not extend back of the eye. Its scales are smaller. Its color is bronze or brownish with little patches of darker color.

The smallmouth bass deserves the greatest of care at the nesting season, which will start when the water reaches a temperature of 60 degrees and continue even up to the time that farmers are cutting wheat. The fish will nest where there is gravel. The water may not be more than a foot deep and may be deeper, say up to 3 feet. When streams fill up with silt, washed in from the cultivated fields, it may be impossible for the smallmouth to spawn. Silt will flow in with the water and fill up the nest faster than the bass can keep the silt fanned out. The silt will smother the eggs, which must obtain oxygen from the water. If the nesting of the black bass could be protected throughout its range, then the streams and lakes, with conservative fishing and good conservation sportsmanship, would produce millions of these fish every year.

The black bass will eat almost anything that moves. As a tiny fry, it will eat the young daphnia. Later it will thrive on mature daphnia, cyclops and other water animals. As it grows it will eat other fish, crawfish and insects in the water or on the surface of the water.

No fish in the world is a better jumper for its size than the smallmouth bass. When hooked it will come out of the water over and over if it has half a chance. It will grow to 8 pounds and larger but a 3-pound smallmouth is a very good fish.

Any natural food of the smallmouth makes good bait in fishing for it, but to seine up such bait, generally, takes good fish food from the water. An excellent way to fish for the smallmouth with bait is to use angle worms and lots of them. The use of artificial lures is becoming more popular, however, and this practice will save much of the natural food for the smallmouth.

Largemouth

The largemouth black bass is a fish of the lakes and bayous. It does not like swift water. In the lakes it will be found coming into shallow water in the evenings, evidently seeking insects, frogs and crayfish. It will jump out of the water to get a dragonfly, and often will try to capture a swallow that drops down to the water after an insect. It is just as eager to eat a bug from the surface of the water as to get the swimming larva of such a bug.

You will recognize the largemouth at once. Its scales are coarse. Along its side is an indistinct black line. By the line along its side you will recognize it best in the water. Out of the water you will know it by its large mouth, which extends past the eye. In large specimens, the black line down the side becomes very faint and the fish is a greenish color. Many largemouth are spotted and mottled with dark spots. They have a greenish color, generally, however, where the smallmouth has a bronze color.

The largemouth is a great jumper when hooked. Sometimes a largemouth, on light tackle, will jump five times before it is landed. The largemouth often jumps out of the water to take the lure. Sometimes it will see an artificial bass bug coming through the air, and leap out to get the bug. At other times, when a bass bug is dragged over bullrushes, the largemouth will jump from the water and seize the lure in the air.

The largemouth in Indiana will grow to weigh 10 to 12 pounds, but ordinarily a 4-pound or 5-pound largemouth is a big fish.

It spawns after the water temperature reaches 60 degrees, and likes to have its nest on vegetation that is just sprouting from the bottom. As it is a lake fish and does not build its nest on gravel, it is not affected by silting as is the smallmouth.

Kentucky Largemouth

The third species of black bass is called the Kentucky bass or spotted bass. It does not get so large as the smallmouth or largemouth but grows to 4 or 5 pounds or more. In Indiana this fish has been found up the Wabash River valley almost to the Ohio line. It was first discovered in Kentucky and was regarded as a fish of that state in particular and hence got the name of Kentucky bass. Later it was found from the Gulf of Mexico north to southern Ohio.

In Indiana it is found chiefly in slow-moving pools of southern Indiana streams. When fishermen tell of catching largemouth bass in southern Indiana, nine out of ten times they have caught this bass and not the genuine largemouth.

The spotted bass is actually spotted; so are the smallmouth and largemouth. So the name does not fit the fish. It is not merely a Kentucky bass, but an Indiana bass, a Texas bass, a Tennessee bass and might be named for many other states. So the name of Kentucky bass does not suit it. In Indiana we refer to it as the river largemouth, and we plant it when we have applications for largemouth in streams of central and southern Indiana, but it is more closely related to the smallmouth than the largemouth, though it looks much like the largemouth. So the name of river largemouth is not a very good one. Perhaps some warden can figure out a good common name for this fish. If so, let's have it. All of the states from Michigan to the Gulf of Mexico are waiting for such a name.

Identification Methods

Don't get worried and fussed if you can not spot the river largemouth right away. Science had looked over all the fish of Indiana for a century and failed to see that this one was different; so you should not worry about not being able to recognize it. But it can be known.

The river largemouth has small scales, like the smallmouth. It has a reddish eye, but many largemouth have a red eye and so does the smallmouth. The mouth of the river largemouth, however, is smaller than the mouth of the real largemouth. The mouth does not extend back of the eye. The river largemouth has the stripe down the side like a real largemouth. The river largemouth is said to have diamond-shaped spots, but so do many largemouth. But the shape of the river largemouth is different from the shape of the largemouth. It is shaped somewhat like a ring perch. Its back arches higher than the real largemouth. Look the fish over carefully, note its small scales and the size of its mouth and the arch of its back. Finally you will learn to know it.

As youngsters, it is very easy to distinguish the river largemouth, the true largemouth and the smallmouth just at a glance and when the fish are in the water. This is how you do it:

Real Largemouth: Stripe on side; end of tail black.

Smallmouth: No stripe on side; banner tail.

River Largemouth: Stripe on side; banner tail.

A banner tail, for our purposes here in Indiana, is a fish tail that has a bar of orange, running up and down the tail from top to bottom; with a bar of black just back of this; and a bar of white or transparency just behind the black bar. Once you learn to know a banner tail, or its absence, you can tell these fish at a glance when they are fingerlings.

As food, we know that the smallmouth is a very delicious fish. Its meat is firm and fine and its flavor excellent. To our taste, it is a close approach to ring perch which are one of the best of all fishes.

As for the river largemouth, we don't know. Most of the fish caught by the Department have been saved for hatcheries or given to accompanying friends. The writer of this lecture does not know how they dress out or what the meat is like. If any one tells you that they taste like any other bass, he is feeding you boloney. There is as much difference between bass and bass as there is between mushrooms and dandelion greens.

The largemouth bass is an excellent food fish no matter what any one tells you. But it can be mucky, weedy or muddy in taste--anything but actually good. Much depends on the water from which it comes. A good largemouth is very good to eat, however, and a poor one is very poor indeed.

Either the largemouth or smallmouth bass will be greatly improved if the fish, after scaling is carefully scraped. The same may be said for almost any other scale fish.

The joker about the river largemouth is that it does not jump. The writer of this lecture has never caught one that jumped and never saw one caught that jumped, and an inquiry to Texas brought the information that they do not jump, but Texas, which

Three Indiana Black Basses -4-

has few smallmouth, added that it is a mighty game fish just the same. And, of course, it is. Further, it is a native Hoosier fish.

In the three black basses, Indiana has three fish of the very highest order. They are game; they are good food; they are able to maintain themselves, having the chance, provided they are not killed off by poisons or silted out by foolish drainage and ditching. These fish deserve the most careful attention and study with a view to improving the waters they inhabit, increasing their food supply, and seeing that they have good and protected spawning grounds.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

FISH FOODS vs: POLLUTION, ETC.

When it comes to pollution, and let's be reasonable about it, Take an example: The writer of this lecture has spent many vacations in Canada, where moose tracks were thicker than cow tracks in a pasture. There were grouse, moose, deer, bears, wild ducks, rabbits, squirrels, wolves, woodchucks and many other kinds of life. In addition, there were countless fish. All of these birds, animals and fish had bodily functions much like yours. There was no sanitary engineering. The excrement from the bodies of all these forms of life went into the water eventually, in one form or another. But there were practically no human beings in that territory, and, therefore, no danger of typhoid. So the writer drank from the cold streams without hesitation.

Here is what happened: As soon as the excrement from an animal got into the stream, it was fertilizer---that is, it was food---for tiny plants. These plants immediately fed on it, just as corn feeds on fertilizer. These plants are called phyto-plankton. They eat animal pollution and decayed plants.

ZOO-PLANKTON-PHYTO-PLANKTON.

There are also zoo-plankton. Phyto-plankton are plants; zoo-plankton are animals. The animals eat the plants. Among the zoo-plankton are such things as daphnia and cyclops. Fish eat daphnia and cyclops.

So we come to this: The excrement from an animal is turned into plant life, which is turned into animal life, which is turned into fish food.

You find the same thing happening in many places. For example, below Indianapolis there are concentrations of fish where the sewage from Indianapolis has become plant and then animal and fish food. So there is usually a place below pollution where there is a great concentration of fish.

But a dense concentration of fertilizer takes the oxygen out of the water and kills fish. Science has not yet found out whether concentrated pollution kills more than it feeds.

The reason pollution kills fish is this: That the pollution begins to decay. When it decays it is oxidizing; that is, it is taking oxygen out of the water and mixing it with the elements in the pollution. When the oxygen is greatly reduced, fish die because they can not breathe.

PLANTS PUT OXYGEN IN WATER.

But plants breathe oxygen into the water. So, farther down a polluted stream, there is a place where the oxygen is more than two times normal saturation. Just below that point you will find concentrations of fish life.

When a flood comes and moves the part of the water that has no oxygen down stream, the concentrated fish may all die because they can not breathe.

Such concentrations of fish will be found where a small stream empties into a larger one. The reason is that the little stream carries foods of various kinds. For example, the little stream may flow through a cow pasture. The manure in the cow pasture washes into the stream. The manure feeds the tiny plants in the water. The tiny plants produce oxygen which fish can breathe. The plants feed such animals as daphnia, cyclops, water sowbugs and side-swimming amphipods. The stream washes these little animals down into the larger stream. Little minnows gather there and eat the daphnia and other foods. Bass gather around the minnows and feed on them. This would be one form of concentration of fish life.

GNATS AND FLIES.

In lakes you will find bluegills around certain weed beds at certain times. If you will quit fishing and pull up some of these weeds and look at them carefully, you will find tiny things crawling on the weeds. Many of these things look like worms. The chances are that you are looking at the larvae of the black gnat. Gnats lay their eggs on the water and the eggs hatch into these things that look like worms but are really larvae. Gnat larvae, known to scientists as chironomids, are a chief food of the bluegill.

Another concentration of fish will be noticed on both lakes and streams, and occurs when there is a hatch of flies over flats or on riffles. You will notice, first, a fly rise to the surface of the water from down among the gravel, stone or vegetation. It will struggle on the surface of the water for a moment or two and then fly away. Thousands of these flies will be hatching at one time. A fish sees a struggling fly and splashes to get it. The splash seems to attract another fish. Soon the lake or riffle is almost one continuous splash. Fish have concentrated there, the food being the attraction. It is needless to say that at such times fly fishing is at its best. The fish taken from a lake during a hatch, will include bass, bluegills, rock bass and minor sunfish. The fish taken from a stream probably will be smallmouth and the big silverside minnows.

LIFE vs: DEATH

You may state the case like this: Life subsists on death, and death subsists on life. In nature you find a constant swing from one to the other---from life to death and back to life again.

For example: If you mow the grass and put the grass clippings into a tank, the clippings are dead and they rot or decay. Decay means that it is turning to its elements again, such as calcium, nitrogen, sodium, phosphorus and many others. But plants immediately pick up these elements and feed on them, and again you have life. And then animals eat the plants, killing them in order that the animals may live. Other animals eat the tiny animals and some of the plants in order that they may live. Still other animals eat only the other animals. Every dead twig of a tree, every log, all the vegetation and other natural debris in the stream add to its fertility.

The kinds or organisms you will find will depend on the surroundings, or, as scientists say, the environment.

Below the Chicago sewage in the Illinois river black gnat larvae are very abundant, and the University of Illinois has written a book about these gnats. They seem to find the environment they need at this place.

Some kinds of crawfish like to inhabit the riffles of streams and find the kind of home they need among the gravel and boulders. Others like the pools.

CADDIS.

Behind some of the low log dams in some of our clear streams you will find caddis fly larvae. Very often many of them will be found clinging to one stone and dragging their cases along with them. The caddis fly lays eggs; the eggs hatch and become larvae or "worms"; the larvae build shells out of sticks, sand or tiny stones, and live with their bodies thus protected and their heads sticking out of the shell or case. If you destroy all of the riffles, you destroy the environment many forms of life need.

Some forms of life are in the water all the time; others are in the water part of the time; others dry up when a little stream dries and return to active life when the stream revives.

When we see a swarm of flies in the air---which we may call millers, or moths---we imagine that these things live in the air. It is only the finished animal that flies around in the air, however. Usually the life in the air is only a second of time as compared to the time the insect has been in the water.

HELLGRAMITE.

Some of the water forms are large, like the hellgramite, which is the larva of the dobson fly. This is a black or very dark gray "worm" that lives under rocks in the riffles. It is good fish bait.

Other forms of water insects are very small, like the black gnat larvae, which will be found crawling over vegetation picked up from any lake. We often see great clouds of these tiny gnats in the air and think of them as air or land animals, but nearly all the life of each gnat has been spent in the water.

LIFE IN WATER.

We think of this life in the water as unpleasant. That is merely because we do not have the power to go into the water. As a matter of fact, the climate of our waters here in Indiana is about equal to the climate of Florida. The temperature never gets so low as 32; that is, it is always above freezing; if it got to freezing it would not be water; it would be ice. And the water never gets so warm as the air. In the water life of any insect, it has a range of temperature of about half of the range of air temperature. Air temperature in Indiana may range from 20 below to 100 above or more---say 120 degrees. But water temperature will range from 33 to around 93---say 60 degrees. When you come to think it over, aquatic life has a wonderful climate in which it lives.

The change to higher temperature---to just the right temperature--- will produce changes in water life. At a certain stage,

and possibly with just the right amount of sunshine, all of the insects of a given kind and about the same time in the water, will begin to hatch. Sometimes the air above the lake or stream will be alive with insects and their wings will make a buzzing noise somewhat like a swarm of bees. Sometimes great swarms of insects will be seen about electric lights in cities and next morning the ground will be covered with them.

CRUSTACEANS.

Many of these insects are small; some are large; all are important to the balance of life.

Many other animals are found in the water. One is called the cyclops because it has one eye. There are many species of cyclops and they are good fish food.

The cyclops belong to the crustaceans. Crustaceans are animals that have an outside skeleton, like a crawfish. There are many kinds of crustaceans. Of daphnia alone there are said to be 60 species, but daphnia are only one small part of the crustaceans.

Nearly all of the crustaceans are good but some of them are very bad. The cyclops, referred to above, is one of the copepods. The copepods are a division of the crustaceans. Most of the copepods are good fish food, but others have become fish parasites. Some of the copepods get into the mouths of fish and, apparently, finally cause death. Others get on the outside of fish and are called anchor worms, but they are not worms at all, but are true crustaceans. You can find the copepods in a fish's mouth by merely opening the mouth and seeing them there. The anchor worm is easier to see, being on the outside. You will notice a red, inflamed spot on the side or back of a fish. If you examine this, you may find a thin, hairlike thing stringing out from the red spot. If so, you have found an anchor worm, which is a form of copepod. The anchor worm anchors itself to the fish by means of anchors on its head, and sucks the juices from the living body of the fish. If you will look at an anchor worm with a good hand glass, you can see its body pumping the fluids from the fish.

Water sow bugs are other crustaceans. They will be found in almost any kind of water. The dry runs in Brown county contain clear water in the fall, winter and spring. The sow bugs live over the dry, hot summer and you will see them in tiny pools, crawling around on the sandstone bottom of the stream in fall, winter and spring.

Another form of life you will find in these dry creeks, when they contain water in the cooler months is the amphipod. This is a tiny animal looking somewhat like a crawfish. It is a side swimmer. Unless you look closely you may mistake it for the fry of a fish as it swims through the water. It is a good fish food.

CRAYFISH.

The crawfish is a big crustacean. There are male and female crawfish. The female carries the eggs on the swimmerets under her tail. When the eggs hatch, the young crawdads remain on the mother's tail. As they grow, their outside skeleton is not big

enough for them. So they moult; that is, they expand and break the skeleton and then grow a new one. After each moult, they go farther and farther from the mother crawfish, but return to the protection of her tail until they have gone through four moults. These tiny crawfish make good food for your game fish. Crawfish that are soft are called "soft craws" by the fisherman. A "soft craw" is any species of crawfish that has just shed its skeleton. Some men have fed crawfish heavily, in a pond, and the things grew so fast that these men always had "soft craws" for fishing. There are many other kinds of crustaceans, but the foregoing will give you a general idea of them.

HYDRA.

We now wish to mention an animal that looks like a plant and shoots darts. It is a crack shot. It is called the hydra. There are many species of hydra. They are all small. They look like the stem of a dandelion that a boy has split with his tongue and curled. The hydra has six curls. The rest of the hydra looks like the stem of the dandelion, being about an eighth or quarter of an inch long. The animal looks like a very innocent plant, but it shoots out darts that you can not see. These darts are laden with the same kind of poison that you find in a honeybee; the poison that makes the sting of a honeybee hurt and causes the swelling.

In the Department office, one hydra has been put in a jar of water with 25 daphnia and left over night. In the morning 24 daphnia were found dead on the bottom of the jar, and the stem of the hydra was swollen in one place, showing that the 25th daphnia had been eaten.

It is known that when hydra are numerous, black bass have left their nests. It is assumed that the hydra could kill the fry of bass.

From this lecture you will see that many things are known about life in the water, but many more things are not known, and when you go into this subject, you very soon get to the end of human knowledge. One reason that water life is so difficult to study is that it is not our element. On the land we are at home. When we get into the water we are in a foreign element and are handicapped.

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FISHING METHODS IN INDIANA

Of all the methods of fishing for sport in Indiana, none has more devotees than the combination of pole and line as used in the summer. Many men and women, competent with more complicated equipment, enjoy pole and line fishing and are to be found on lakes and streams enjoying this form of sport. The sport extends from bass fishing to the genuine sport of carp fishing.

By far the most numerous of all pole and line fishermen are the bluegill anglers. Thousands of boats are on the lakes of Indiana every day during the summer fishing season, unless it is in windy or rainy weather. Though many people are coming to fish for bluegills with factory-made tackle, it is true that most of these fishermen and fisherwomen and boys and girls, will be found fishing with the long cane pole and line with cork and bobber. It is also true that many of the cane pole fishermen have reduced their sport to an art, and make much of their own tackle, which has been greatly refined. The most pains-taking bluegillerman is very careful as to the style and size of his hook, the exact weight of his cork or float, the kind of line he uses, and length and balance of his cane pole.

Bluegill fishermen also cover a wide range, from ignorance to the keenest of fishing sense. The average one-day or one-week visitor to a lake may know little of the art of bluegill fishing, and may be content with any kind of pole, coarse line and bobber, any kind of hook and sinker. But the refined fishermen, with his balanced and carefully prepared outfit, is careful about the place he fishes and observes what to him are the proper fishing procedures.

In visiting lakes and talking with bluegill fishermen, we often hear the expression, "bluegill hook", and now and then some one will boast of catching a big bass on a "bluegill hook". It is to be hoped that wardens will not use such expressions. Wardens ought to know something about the bends and sizes of hooks. An average bluegill hook might be a No. 6 or a No. 8. It is nothing rare to hook and hold big fish on such hooks and some very large fish have been caught on smaller sizes.

No one should imagine that fishing for bluegills is merely an old woman's recreation. There is a great thrill in seeing a bobber move and go under the water, and there is a real thrill in handling a fishing bluegill even of average size on the end of an 18-foot cane pole with a small, flexible tip. Bluegill fishing, on an Indiana lake, in the evening, with the brilliance of the sunset reflected in the water and the bluegill fleet at anchor, is a scene worthy the skill of the best painter.

The bait used in bluegill fishing usually is angle worms. In fact, earth worms of small or large size, are a good bait for almost any kind of fish, including bass, and when this form of bait is used the minnow population, which is important to feed our larger game fish, is not depleted or reduced. In addition to earth worms, catalpa worms, crickets, grasshoppers and other baits are used.

Another form of fishing similar to fishing for bluegills is

angling for crappies, but in this very small minnows usually are used. Sometimes, however, pearl buttons are used for bait and the lure is kept moving.

Pole and line fishing for bass and other large game fish is just as exciting as any other kind of angling. If earth worms are used for bass, a fairly large hook should be tried, something as large as a No. 2 or even larger, and a large bait should be strung on the hook -- sometimes a number of worms with the ends wriggling. Even northern pike can occasionally be taken on such a lure.

Minnow fishing for bass is one of the most exciting of sports, either on a lake or along the streamside. A minnow of 3 inches or more is hooked, usually through the lips, and allowed to swim about. The game fish usually excites the minnow to activity before it strikes. The minnow will struggle to get free from the hook and escape and the novice is likely to think this is the first strike of the bass. To wait until the fish actually takes the minnow requires an unusual kind of patience and self-control. Even after the minnow is taken, another wait is necessary. The fish will make a run with the minnow and there are few experiences more exciting than this critical time, when the angler must not be too quick to set the hook. The line is run out with a continued rush, and just before it is brought taut, the hook is set. The same method is used, whether the cane pole and line are used alone or the pole or rod be equipped with reel. From the view of conversation, fishing with minnows is something that should not be carried too far, as the minnow supply in many streams is now much reduced.

Spatting is another excellent sport. It is carried on with a long cane pole and with a frog or artificial minnow or large fly. The art is applied usually on a lake. A good oarsman pushes the fisherman around the lake and the long cane pole swings an equal or longer length of line, to which is attached the frog, spinner or other lure. The bait is tossed into open spaces in the spatter dock, or near vegetation or along the shore line. This method is one of the best for taking bass and if artificial lures are used, is to be encouraged as artificial lures save the natural food supply.

On streams a similar method is often used. A cane pole and spinner may be the favorite equipment. The fisherman wades slowly down stream, casting to the vegetation or large stones along the bank, or to big sunken boulders in the deep pools. This is a very sportsmanlike manner of fishing, and the outfit is not expensive, so that any one can indulge in it.

Trolling is another favorite method of fishing, and often minnows or suckers are used. One of the best ways of trolling, however, is to use a large spinner or spoon, the size varying with the kind of fish it is intended to catch. The artificial lure is to be encouraged, whenever it is possible to do so without disturbing the good will of the fisherman, and again the reason is to save the natural food for the game fish.

Trolling may be done with earth worms for bluegills, rock bass and even bass. It may be done with suckers or minnows for bass, northern pike and wall-eyes. Or very small spinners may be used for bluegills and rock bass and larger spinners or spoons used for bass and northern pike. Usually one man is assigned to the

oars, but if a breeze is blowing, the angler may row alone to the windward side of the lake and drift across. In either case, one of the important points is to get the lure over good fishing grounds, and these grounds may vary with the season and the time of day. In trolling for northern pike, it may be that the deep waters will hold the fish in summer, and that the lure should travel deeply and slowly. At any season of the year, when trolling, it is often a good trick to move the boat in long, circular courses, so that the lure seldom travels directly behind the boat. Such methods, used on our Indiana lakes, will often take the big pike even in hot weather.

Winter Fishing:

One of the most troublesome of all subjects in conservation is winter fishing. Each individual has his own private opinion about it. If the individual is a city man, he likely believes, and sincerely, that winter fishing is depleting the lakes of bluegills. If he lives in the country, he may believe that winter fishing is not so heavy a toll on fish as summer fishing. The city resident believes that the winter fisherman is spoiling his summer's fun. The rural resident may believe that the city complaint against ice fishing is playing the dog in the manger, and trying to spoil a winter sport in which the city man does not indulge. Guiding a clear course between these two contending opinions -- both sincere -- is a difficult task for both the central offices and the wardens. Observations may indicate that there are times when winter fishermen get large catches. Observations may also indicate that these periods occur very seldom. Further study of this question is in progress, and the ultimate solution should be founded on justice to all sportsmen, both winter and summer, and on facts and not on prejudices or opinions.

For bluegill fishing, the most refined of tackle has been devised by the winter fisherman. Often gut is used for line. Very often an actual horse hair is used for a leader. The bait, as a rule, is the larvae of the caddis fly. Caddis means case. The caddis larva lives in a case. The case is made of pieces of sticks and stones. The caddis larvae are not hellgrammites in the true sense, though they are called such. The true hellgrammite is the larva of the dobson fly and is found under stones in streams and does not construct a case.

Large pike and bass are sometimes caught in the winter, but the tackle is heavy and the bait usually is a live minnow.

For crappy fishing in the winter, anglers very often bait with a pearl button and move the lure. Many anglers seem to regard a pearl button as one of the very best crappy lures.

Trot Lines:

In most parts of Indiana trot line fishing seems to be yielding its place to other forms of angling. A trot line is a long strong cord, to which are attached smaller fish lines and hooks. Many kinds of bait are used -- angle worms, various kinds of meat and minnows. In many cases the lines are set for catfish. The main line is left and the attached line, if it contains a fish, is unhooked or untied from the main line, and the fish and attached line are taken ashore.

A boat usually is used in running the line, and the trotting back and forth from one end of the line to the other probably gives the name to this form of fishing.

Throw lines are heavy cords, attached, usually, to something on the bank by one end. A weight is fastened to the other end of the cord, and on the main line are radiating smaller lines, each with a hook. The line is set by throwing the weight out into the water. The line is drawn in to detach any fish that may be caught.

Trot lines may be set in either lake or stream. Throw lines usually are used on streams.

Rod and Reel Fishing:

Except cane-pole bluegill fishing, rod and reel fishing is the most common kind of angling. The tackle includes anything from a cane pole to the most expensive rod; anything from a cheap cotton line to the most expensive double- or triple-tapered silk; anything from a coarse hook baited with chicken entrails to the most refined plug, spinner or fly.

The use of the rod and reel for bait fishing has been adequately described in the foregoing, but in bait casting, the ultimate of all art is found. Though there seems to be a common impression that fly fishing is the most difficult to learn, it is likely, could actual tests be made, that much more finesse is required to cast with a casting rod and do the job in an artistic manner, than to cast with a fly rod.

The rod used in bait casting may vary greatly, from a home-made tool of sections of a cane pole, to the most exactly and nicely made rods. The length will vary with the liking of the individual fisherman and the water he casts. On the upper Wabash, for many years, men have made their own casting rods, some of them 12 feet long, some made altogether of common cane, others with split bamboo tips. The long rods are preferred on this stream because, by holding the tip aloft, a spinner may be guided over the treacherous limestone ledges and slabs, which would catch a spinner reeled in with a shorter rod. Even on the Wabash, however, shorter rods are used.

Many anglers prefer a rod of $5\frac{1}{2}$ feet, because it is short enough for them to hold the cork grip in one hand and untangle a loop at the tip top with the other hand.

The lines used vary in strength. Any angler can cast farther with a light line, and it is often regarded as more sporting to take fish on a 12-pound than an 18-pound line. This is open to some speculation, however. For example, it might be better to catch a fish on an 18-pound line and actually catch it, than to let one get away, with a 9-hook plug in its mouth, by snapping a lighter line.

The reel used in bait casting is very important. It may be expensive. Yet, in the last few years, very good reels may be had for a modest outlay of cash. The reel is called a quadruple, and theoretically, the spool turns four times with each turn of the handle, but in practice, the spool may turn a trifle less than four times. In any case, this type of reel allows rapid reeling.

Many types of plugs are used with the casting rod, but in recent years there has been some turn from the many-hooked types and even heavy spoons are used. The rod that will cast a heavy plug, however, will not do so well with a light spinner where a lighter, more flexible rod is better.

Bait Casting.

Bait casting is practised on practically all fishing waters. The exception is the very smallest creeks.

In fishing streams, the practice usually is to cast to logs and hidden boulders, and into or over the pools. In lake fishing, the fisherman generally casts to the shore line or over vegetation. Sometimes, however, anglers will cast a heavier-than-water lure into the depths of a lake, let it sink, and then retrieve it. This is something well worth trying in hot weather or at mid-day.

Some of the largest trout taken in Indiana have been rainbows, caught with bait casting rods and by the regular casting methods. Usually a spinner or other metal lure was used, such as a small-sized wobbler.

Casting rods also are often used as still-fishing rods and they are very effective and useful for this purpose. With a light weight, a baited line may be placed far out in a stream and the bait left there to await the strike of the fish.

Use of Fly Rods.

In recent years the use of the fly rod has increased greatly, not because it is the most effective way to fish but, most likely, because many fishermen get a great thrill from the bend of the long wand when a fish strikes. Fly fishing looks difficult, but it is, in fact, very easy for any one to learn. After learning, however, one can continue to improve his casts and to vary them throughout a lifetime. There are thousands of good fly casters; few are really artists under all conditions of wind and obstacles.

One sport with the fly rod not commonly mentioned is the use of earth worms. With a No. 6 carlisle or sneck hook (or any other of your choice) you can cast two or three wriggling angle worms without snapping them off and a bluegill finds this lure irresistible as a rule.

Most fly rod anglers, however, regard the use of trout flies as the best means of taking such fish as bluegills, sunfish and crappies. Sometimes wet trout flies are used, and are allowed to sink, when they are retrieved slowly and unevenly to the surface and cast again. Sometimes dry flies are used just as in trout fishing, and are allowed to rest on the surface until the bluegill strikes or the flies are picked up to be cast to a new location.

Some fishermen -- and the number is growing -- use fly rods for casting small spinners for bass and rock bass. The spinner is especially attractive in streams but is often used in lakes. In the streams, if fished down stream, the drag of the current keeps the lure moving and attractive.

An increasing number of anglers are using their fly rods for trials at the trout that have been planted in Indiana, and in many cases they are successful. Either angle worms or wet or dry trout flies may be used.

The most common use of the fly rod, however, is with bass bugs, usually on lakes but very often on streams.

In stream fishing, a common method is to cast up-stream and allow the bass bug to float toward the angler, shortening the line as the bug approaches, and then repeating the cast. Excellent bass are taken by this method from streams, especially when there are hatches of natural flies, or when a meadow borders a

stream and every bass in the drink is looking for grasshoppers. Short casts, properly placed are all that nature requires for fooling the bass under such circumstances.

It is on still waters, however, that fly casting is most practised. From the strip mine ponds and lakes of southern Indiana, north to the Fawn and St. Joseph valleys, there is scarcely a puddle of water that has not been cast over by the fly fisherman. On summer evenings at popular fishing lakes, many fly fishermen may be seen at one time. Yet only a few years ago the fly fisherman was rare and excited the curiosity and doubts of most observers.

In fishing lakes, a good trick is to fish over the potometetons, which can be identified by the seed heads that usually protrude above the water. Other types of vegetation make good fishing, and the edge of cattails and the middle of patches of bullrushes are good prospects. Fishing the rushes with a fly requires great patience, but these patches are always the feeding grounds of bass, bluegills, rock bass and other fish. A high cast that will put the fly over the rushes and let it sink down to the water is a proper procedure. Then the fly must be retrieved slowly. Often it will follow the line over a rush, and it is not uncommon for bass to strike the fly when it is in the air. The difficulty with this kind of casting is hooking the bullrushes with the point of the hook. With care and patience this can be prevented.

Fly Fishing Tackle.

There is a mistaken idea that fly fishing tackle is expensive. The fact is a good rod can be bought for a modest sum. Formerly English lines were regarded as the proper thing, but today American lines are as good as any in the world. For most Indiana fishing a level line is the proper thing and is better than a tapered line at three or four times as much. Leaders may be bought in lengths of 3 to 10 feet and of different weights and tied to form a tapered leader, which is a good thing.

A level line is a line that is the same diameter throughout. A tapered line is one that grades down from a coarse to a fairly fine line. The weight of line is designated by letters -- C, D, E, F, G, H. C lines are heavy, and H lines light. Ordinarily a D level line would be about right for the average rod. Good fly fishing can not be done with a light line.

The rod may be from $7\frac{1}{2}$ to 10 feet long, and ordinarily the angler will be found using one of 9 or $9\frac{1}{2}$ feet. It may be of split bamboo or of steel. Modern steel rods can be made with practically the same action and weight as bamboo rods.

The reels may be single click reels or automatics. Either is good. Both have advantages. Many old fishermen prefer the click reel because they like to let the fish run against the reel and hear the noise of the click. Many others prefer the automatic because they can take in line much more rapidly than with the single action winch. The reel for fly fishing is less expensive, as a rule, than for bait casting.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

FISH PROPAGATION.

In Indiana fish propagation usually refers to pond culture of fish. It applies to the black basses, rock bass, bluegill, red-ear, both crappies and catfish. The ponds may be of almost any size, from a fraction of an acre to five acres or more, but in any case some mechanical arrangement must be provided so that the pond may be filled with water and may be drained.

Ponds should be fertilized, limed if necessary, and then filled with water, in March. Cow manure is a good fertilizer for fish ponds. The first application may be rather heavy, as it will have time partly to decompose and provide food for daphnia and other forms of life on which the young bass will feed. Any later applications of manure should be applied more lightly. For an acre of water, 20 bushels of manure, early in the spring, would do no harm. Later in the year, a half bushel at a time ought to provide plenty of additional fertility that may be needed.

Lime is a cleanser. It also stimulates the growth of many kinds of vegetation. Lime, placed in a pond in March, would tend to purify the pond of parasites. As a rule, however, lime is not necessary in a fish pond. If algae, which is a green scum on the water, becomes very heavy, lime may help to reduce it but will not eliminate it.

Millions of eggs of daphnia will be on the bottom of an old fish pond. These will hatch when the water is turned in. The pond should remain filled until fall.

Treating Parent Fish.

In the spring, parent fish may become covered with white spots. These spots look like mould. They are a variety of water mould or water fungus. In other words, they are plants, just like barber's itch or impetigo. As these spots are white, they do not contain chlorophyll. Chlorophyll is the green matter in plants. As they contain no chlorophyll, they do not need sunlight. So fish become more fungused, probably, in the short- or days of early spring and in cloudy weather. Sunshine tends to help the fish recover. If the outbreak is bad, the fish should be removed from the pond and treated with salt. Raw salt may even be sprinkled on the sore. Usually a saturated salt solution is made, and the fish's white sores are bathed in this salt water. Sometimes the fish is placed in the salt water and left until it comes to the top gasping. It is then placed in a tub of fresh water, where it quickly revives. It is then placed back in the pond. Salt will cure fungus and is the most common and accessible treatment.

Smallmouth and rock bass should have gravel to nest on. In a club pond, it would be good practice to place two or three boulders together and put a bucketful of good gravel on the side of these boulders away from the bank of the pond. The boulders will shelter the fish from persons walking along the bank.

Largemouth will spawn on a piece of sod turned root-side-up in the water, or will use the vegetation that is sprouting up from the bottom in the spring. Bluegills and red-ears will spawn on sand or gravel or even on muck. No special provisions need be made for these species, but nests should be provided in advance for smallmouth and rock bass.

Handling Parent Fish.

Fish usually are held over winter in a separate pond. The water in this pond may be lowered, and the fish seined to the bank. The parent fish should be carefully handled, as fungus is likely to start wherever a scale is loosened. One way of handling a parent fish is to grasp it by the lower jaw, the thumb in the fish's mouth and the index finger below. A better way is to get the fish with both hands, one hand at the head, with the thumb on the upper part of the snout and the other fingers below the lower jaw, the other hand gently holding the caudle peduncle or part just above the tail fin. A fish held in this manner usually does not struggle and it should not be squeezed. Small fish are handled gently with a hand on each side and the snout between two of the fingers, or maybe grasped loosely in one hand, with the snout between two of the fingers.

The female fish may be distinguished from the male fish by the shape, as a rule, and also by the inflamed vent. But a male that has just eaten heavily may look like a female. Any one acquainted with fish may make a pretty good guess as to which is male and which female, but no one can know absolutely from outside appearances. A few more females than males should be placed in a pond. A half dozen nests in an average pond will give a good yield, which would mean 6 males and possibly 8 females.

When the water reaches a temperature of 60 to 62 degrees, the male fish begin spawning activities. First they start whipping the beds. The male will fan out a nest with his tail and fins.

When the nest is made and the water temperature is 60 or more, the male fish finds a ripe female and drives her on the nest. The female deposits her eggs as the male, lying beside her, fertilizes the eggs with his milt. The female then leaves the nest, and has nothing else to do with it. The male builds the nest, fertilizes the eggs, guards the nest during incubation, and later takes care of his large family.

It is a good plan to have fair-sized parent fish. A 2-pound bass would be a good size. A very small male bass, however, often has a good nest of eggs and brings off a big hatch of fry. In fact, small males seem to make excellent parents.

When bluegills, rock bass and similar fish, it is well to have large parent stock. In that way fish culturists can avoid any strains of small fish, if there are actually such small strains.

After the male has driven one or more females over his nest and the spawning has taken place, he stands guard. He is very brave. Even a common sunfish will get between a fisherman and its nest when the fisherman wades toward the nest. A bass will drive any other fish, unless it be a very large one, away from its nest,

and probably would seriously wound a large carp or sucker. It fights with its dorsal fin, which, when raised, is like a saw.

If a cold snap comes while the bass is guarding its nest and the temperature of the water falls to 40 or less, the eggs may be chilled and killed. If that happens the bass will leave its nest, the eggs will appear white, and the production of fry will be reduced by thousands. This often happens in a hatchery pond.

The time taken for egg incubation depends on water temperature. It is likely that sunshine has something to do with it, as bass and other fish of this general kind, always build nests where the sun can shine on them. Before the eggs actually hatch, they become very active, and a nest of eggs will be found to be "working" like maggots. Then the fry will hatch and rise from the bottom, hovering around the nest. If the temperature is low at night, the fry will settle on the nest again for the night, but will rise again the next day if the sun is shining and the water warms.

Handling Fry.

When the fry are hatching, the nest may be cribbed. A crib is a wooden frame, covered on the sides with cheese cloth, and tall enough to extend above the water level. It is open at top and bottom. This crib is set around the nest, enclosing the fry. The fry may be held for days in this manner, provided they are fed. The feed is daphnia. Usually there will be daphnia enough within the enclosure, at that time of year, to keep the young fed, but if not, daphnia must be poured into the crib.

The fry may be placed in a pond where there are no parent fish, or may be placed in barren waters, such as a newly made lake. When some species of fry are thus spread to other waters, observers often assert that the pails of fish are just so much water; that there are no fry present. The fry of such fish as largemouth and bluegills are nearly transparent and invisible. The fry of smallmouth, however, are black and easily seen. The fry of smallmouth are smart as soon as hatched and if allowed to swim about in a pond are very difficult to seine. So nature seems to make up for the black color of the smallmouth by making it more capable of escaping than are other fish. This intelligence of the smallmouth goes with it into the fingerling stage. It is also difficult to trap, but largemouth are easily trapped as fingerlings.

Feeding Parent Fish.

Bluegills will, ordinarily, obtain enough food from a pond to keep them in good condition, but parent bass must be fed. If the parents are with the young, they should be fed on minnows. One method is to seine minnows and place them in a pail without water, and when they are dead or nearly dead, throw them into the pond. Another method is to pinch each minnow, wounding it, before it is thrown into the water. If feeding is not done, parent bass will eat their own young.

Feeding Young Fish.

The young fish are called fry until they are 1 inch long; then they are called fingerlings. The supply of daphnia naturally in a pond will keep the fry going until they are an inch long, but when they get about 2 inches long they are looking for larger food, and, though they will take daphnia, they will do better and cannibalism will be reduced if the fish can get minnows and insects.

In any pond, flares or electric lights may be used to attract insects at night. Many of these will be singed by the flares and fall on the water, where young bass may get them. Electric lights will attract many to the water.

If there is a pond or lake where young minnows may be obtained, they may be turned into the pond alive with the bass, if the minnows are not larger than the young bass. In some cases an attempt has been made to raise minnows in a separate pond. In other cases minnows and suckers have been raised in a pond with the bass. So far as is known, suckers seem to make an excellent food for young bass. It is the dream of fish culturists to find a means of feeding young bass automatically; that is, with a food fish, insect or crustacean, placed in the ponds with the bass and multiplying there.

In the very late season, in many ponds, there is an apparent increase in larger forms of food. These include water sowbugs and other forms of life known as scuds or shrimp. They are not true shrimp, however, but are known as amphipods. These also provide a large amount of food and help to feed the parent stock of bluegills as well as the young of many species of fish.

Planting Fingerlings.

Fingerling bass are planted in cans hauled to the place of planting. So long as a truck is moving, there is little danger of the young fish dying. But if a truck stops, air is no longer sloshed and pounded into the water, and the young fish will quickly exhaust the oxygen supply and die, unless there is a system of aerating the water or the truck is equipped with a system for circulating the water.

Arriving at the place to be planted, the fish should be tempered in slowly. If the water to be stocked is colder or warmer than the water in the cans, some of the water must be poured from the can, and some of the water from the stream or lake must be dipped into the fish can. This should be continued until the water temperature is about the same in both. Then the fish may be poured out of the can. A good way, if there is time, is to sink the can into the water and let the fish swim out as they are inclined to do so.

Oxygen Depletion.

Very often, in a fish pond, probably in August, many young and some parent fish will die. They will be found dead in the morning. There is a very definite cause for this, and it is

something that should be guarded against as much as possible.

In August the days grow rapidly shorter. There is thus less sunshine. Vegetation breathes oxygen into the water only when active. It is active only in the sunshine. So, in the night, vegetation puts less oxygen into the water than in the day.

Warm water holds less oxygen than cold water. So, if you get a hot August day, with little sunshine and warm water, and then go into a long, hot, August night, the fish may suffocate in the night and be found dead the next morning.

This does not happen often and it seems to happen to rock bass more than to other fish. At hatcheries, if vegetation has been removed, in preparation for taking out fish, and if the water in the pond has been lowered, and if the weather turns exceedingly warm and the day is cloudy and the night warm, you have a combination that may kill thousands of fish.

Predators.

Months ago, a list of questions was submitted to all the hatchery foremen of Indiana with regard to predators. The result was that the hatchery foremen themselves are shown to be in disagreement about killing predators. Some foremen would kill all of them on sight; some would be extremely lenient. Reports show that many predators that have eaten no fish whatever are killed at hatcheries. Other reports show that many predators have eaten large numbers of fish. For example, one green heron, killed at 11 o'clock, contained 13 smallmouth bass 2 to 3 inches long.

Every hatchery pond is a decoy to predatory birds, and kingfishers and all kinds of herons and bitterns are likely to be lured to the ponds. There are many bird lovers who get as much pleasure from seeing a heron, as a fisherman gets from catching a fish. The lovers of birds are worthy of every reasonable consideration, and birds that eat fish should not be destroyed ruthlessly. Yet the ponds must be protected. When birds come to a pond regularly and insistently and are seen eating fish, they have to be killed. But the campaign against them should be kept at its very minimum; such birds should not be killed indiscriminately.

Purpose of Fish Planting; Cropping.

The fish hatcheries operated in Indiana cannot, of themselves, provide enough fish for the fishermen to catch. When you compare the relatively few acres in fish ponds to the vast acreage of lakes and streams, you will see that the hatcheries never can produce the fish that fishermen catch. At least they can not do this until new methods are discovered and the hatcheries can be greatly extended.

The purposes of planting fish are three: First, to get new species into a stream or lake; second, to plant new waters; third, to provide a parent stock that can spawn naturally in the water planted.

The extending of species can be accomplished. Fishermen are beginning to catch red-eared sunfish from lakes where they formerly were unknown. There is a demand for channel catfish in northern rivers, where these fish have been practically unknown

and where they can not reproduce unless dark nesting places are provided for them; but channel catfish probably could be developed in these streams.

Newly made lakes can be planted quickly and with smaller fish and in greater numbers than waters that already contain fish. Fry and No. 1 fingerlings can be placed in the new lakes of southern Indiana, and they will grow rapidly and quickly populate the water. Enough has been proved within the last two years, to make this statement definite.

The plants in waters that already contain fish are made with the idea that the young fish will survive long enough to spawn and give an increase. The plants are not made with the idea that the fish that are planted will themselves provide enough fishing for the sportsmen. They will provide some fishing, of course, but their chief purpose is to provide parents in two or three years that will help to repopulate the stream.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

DISTRIBUTION AND PLANTING FROM STATE HATCHERIES.

The actual method of distributing and planting fish from state hatcheries in 1937 will be essentially the same as it was in previous years, except that we hope to simplify the truck schedules and means of notification. In the past there have been times when difficulties have arisen because of a mix up in schedules, or change in routing, or some mechanical break down, which we hope to circumvent this year by spreading the distribution over a longer period during the summer.

Delays Might Occur.

Regardless of the system which may be evolved there will always be emergencies which will require last minute shifts. The planting of fish raised is one of the most critical steps in the whole hatchery process and must be handled with extreme care. Weather, condition of the ponds in the hatcheries, condition of the water to be planted, size of the fish, and a number of incidental factors must be considered. To set down iron-clad rules of distribution would be an impossibility.

Nevertheless, within limits it is possible to point out the proper procedure for wardens and clubs to follow in order to get the greatest benefit from fish raised by the department. It is very important that fitness of the pond reared fish for the water in which it is to be placed should be considered. Without giving due thought to the environment, there will be waste, unwittingly, of thousands of costly and valuable fish.

Selection of Proper Places for Planting.

There are certain general rules to follow. Largemouth bass and bluegills are fish which thrive best in ponds. They should not be put in streams. In backwaters, or bayous, they get along all right as they are essentially fish of quiet waters. With smallmouth bass, and rock bass the situation is reversed. They should be placed in streams but will often thrive in the colder, gravel bottom lakes. But why put them in lakes and ponds when they will do so much better in flowing water? Remember that in planting fish you are trying to help nature a little bit, trying to replace that which has been taken by an unnatural means. So, try to do things in as natural a way as possible. To say that fish should never be put in streams where they are not found may be stretching a point, but in many cases it would be well to abide by that theory.

Factors to be Considered.

There are other things to remember, aside from what fish goes in what kind of water. Mr. Andrews covered that field in his talk on distribution of fishes. The apparent food supply

is often a deciding factor. You may know of a pond which is teeming with bluegills which never seem to get more than a few inches in length. A few largemouth bass were put in the pond and in a couple of years they started to catch nice sized bluegills. In that case they were too crowded, and the amount of food was not sufficient to let them grow to great size. But the bass came along, cleaned out some of the bluegills and then the others had a chance to grow. In general, the approximate poundage of fish in a lake or stream is the only index as to the amount of food there. At least it is the only practical way to determine the amount of food. You could take plankton seines and dredges and make quantitative studies of the fish foods to be found in certain water, but procedure like that requires years as well as carefully trained men. Sometimes, if a warden is familiar with types of fish foods he can inspect a pond or stream and determine what and how much is there. Seeing a great wealth of a particular kind of food in the water during one period of the year is not necessarily an indication that there is an abundance of food. There may be a lot at one time but at other times there may be a great scarcity.

The chemical and physical condition of the water should also be taken into consideration, in making preparations for the planting of fish. Pollution in any form should be a danger signal. There is no excuse for planting fish in water where they cannot exist. Also fish should never be placed in a stream or lake which has ever been known to go completely dry. This may sound pretty hard on some of the counties in the southern part of the state, but the fact remains that planting fish in intermittent waters is foolishness.

Predatory fish must be considered also, because they play a definite part in the control of the numbers of game fish. Before planting fish in waters infested with gar and dogfish, measures should be taken to clean out these unwanted species. Unless they are taken out the fingerling game fish will serve as nothing more than appetizers for them.

After having decided upon the waters to be planted the clubs should obtain applications from the office. These applications are to be filled out in full and signed by the county Conservation Representative. Upon their return to the office they are placed on file until the time for distribution arrives. This time will vary with the weather, season, and fish to be delivered. Bass and bluegills will be distributed as they reach fingerling size throughout the summer. Crappies are not delivered until late in the fall. Trout, and wall-eyed pike and ringed-perch fry are distributed in the spring.

Meeting the Truck with Proper Equipment.

When a delivery is to be made, the warden, the County Representative and the applicant are notified as to the species of fish, date, time, and place of arrival of the truck. Clubs are urged to have clean cans on hand, for speed is the essential of fish distribution. If the applicants show up with dirty or

greasy cans the driver is under orders to plant the fish himself or to move on to the next stop if he is rushed for time. The welfare of the fish is the first consideration. To lose them at this stage of the game would be inexcusable waste. The fish should never under any circumstances be held in tanks for any length of time before planting. Even if the truck gets in at three A. M., the fish should be planted immediately. Every effort is made to see that plants of bass arrive at respectable hours, but emergencies do arise and they must be met. In the case of trout plants the truck travels all afternoon and night and, as some of you know, or will find out, it is often that the wee small hours are the time of its arrival.

Technique of Planting Fish.

In actually planting the fish there is a certain technique to be learned and followed closely. For even though fish just planted may swim off hastily, they are apt to have undergone rough treatment which will result in their death later. The water in which the fish are placed, and the water in the cans should be of approximately the same temperature. If there is a distinct difference the water in the can should be poured out a little at a time and water from the lake or stream put in the can. This procedure is known as tempering the fish. Hardening them to a new environment. It is almost certain death to the fish to take them from warm to cold water. They will get along better if taken from cold to warm. The best way is to get the water the same in temperature.

The cans should be placed in the water on their sides after having had the water tempered, and the fish should be allowed to swim out slowly. The man who longs for better fishing, but who picks the can up, tilts it over, and allows the fingerlings to cascade to the surface of the lake midst a big splash and lots of excitement, ought to have his head examined. That's one good way to waste fish.

Above all other things, speed in handling and condition of the cans are important. Get your fish in the water quick, via clean cans and the results will be satisfactory.

Warden Should Keep his own Record.

It is a good idea for the warden to keep an accurate record of all fish plants made in his territory although this is not required from him. The applicant, or the recipient of the fish is asked to sign the delivery card which the driver will present. The warden will find that being able to tell some irate disciple of Ike Walton that "Yes your favorite fishing hole was planted with such and such a fish, so long, on such and such a date" will get him out of a lot of holes.

There are times when the warden will not be able to meet the delivery truck personally. Then he should appoint some reliable person to substitute for him. The warden should be present if at all possible.

Value of Fish Planting.

Planting fish has received a great amount of attention from

conservationists in days gone by. It is still one of the major activities of the department, despite the fact there is considerable doubt of its effectiveness in some quarters. When carried on with caution, when fish are handled with care, when streams, lakes or ponds to be stocked are carefully chosen, there is no doubt that it is very worth while.

For a complete summary of the propagation and distribution of fish in the fiscal year 1935-36, the warden is referred to the year book of that date.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

STREAM AND LAKE IMPROVEMENT

Improving fishing waters in Indiana without spoiling it, without interfering with the rights of others, and doing the job scientifically and practically and at low cost, is becoming a major problem. It may be that we have made many mistakes, but some of the things that have been done have proved good. It may be that more mistakes will be made, but as we gain experience, we also improve in methods and understanding.

The fishing waters include both lakes and streams, and improvements have been made in both.

One of the greatest destroyers of good fishing in lakes is the alien carp. The carp of itself is not a really bad fish. But his habits are unbearable and cause the loss of millions of fish every year. The carp belongs to the same family of fishes as the minnows. He is called a cyprinid. He really is just a big minnow.

The chief damage of the carp in lakes is that he roots around on the bottom and thus roils the water. When water is roiled (made muddy), the sun can't shine through it. When sun can't shine through the water, vegetation can not grow up from the bottom. All green vegetation, whether in the water or on the land, must have sunlight. So, when carp become too numerous, lake vegetation may disappear.

In Bass Lake, Starke County, seining has been carried on for two years. Carp and quillbacks have been removed from the lake, and the result is that the vegetation is coming back. Many more young game fish are seen than for many years and the fishing greatly improved in 1936. This is one type of lake improvement.

All vegetation should be protected in lakes, and carp are not the only animals that destroy it. Bathers, wading into the water over a beach, may destroy vegetation. In some cases, vegetation is removed to get boats away from docks or landings. When the vegetation is removed, the harbor for many kinds of insect larvae is removed. When you lose this insect larvae, you lose fish food. When vegetation is removed you lose protection for all kinds and sizes of fish.

The old idea about improving a lake was to mow all the weeds, take out all the bullrushes and cattails, remove all the sticks and logs, and make a general cleaning. We know now that this was wrong. Hollow logs, sunk in the lake, make nesting places for many kinds of fish, including catfish. The logs make shelters for bass and other fish. As the log slowly decays, it provides plant food for floating plants, some of them invisible. These plants feed small animals. The fish live on these small animals.

Brush Shelters

Brush shelters may be sunk in lakes and cause very definite improvements. If it is desirable to have catfish, hollow logs make an improvement.

The brush shelters may be large or small and may be of only a few sticks or of many sticks. These should be anchored to the

bottom. It is not good practice, however, to place only a few such shelters in a lake. The shelters should be scattered so that the fish will not be lured to a single part of the water, where they can be easily caught. In placing shelters, they should be in water deep enough to cover them and leave room for a boat to pass over the top. Such water will be shallow enough to make good fish harbors.

In case channel catfish are tried in a lake, nesting places should be provided and these also will be used by fish as shelters. The nests should be hollow logs, facing the northward, so that no sunshine can enter the log. Sunshine will kill channel catfish eggs.

As most of our lakes seem to have an abundance of vegetation for cover, it is likely we will find that the most important improvements can be made in the streams. Dams are the very natural impulse of those wishing to do stream improvement, and if dams are rightly placed and correctly constructed, they will make an improvement and will also increase the water area and feeding grounds and help to maintain a higher water level in time of drought.

Dams in Streams

One of the very first rules of dam construction for fish improvement is that the riffles shall be saved. The dam itself must be made to serve as a riffle. The reason for saving the riffles is that they produce many forms of the most important fish foods, such as crayfish and hellgramites.

To avoid having to place fish ladders at the dams, the rule in Indiana is that no dam shall exceed 4 feet in height. But if a dam is rightly constructed, no fish ladder will be needed, as the fish will go over the dam even in time of drought.

Dams will do a greater good if built a foot high, in some streams, than if built 4 feet high. A whole series of dams a foot or two high can be built as cheaply as one dam 4 feet high, and the benefit, in many cases, will be greater. How this is done we leave to the engineers, but the best dams we have seen in Indiana may be described as follows:

They are logs, cribbed with boulders and gravel. The logs are anchored deeply into the banks. The boulders hide practically all of the logs. There is a long downstream slope, where the water spills around the boulders. The gentle slope and the broken water make it possible for a fish to come up over the dam at any time. Below such a dam will be a good pool, into which food will be washed from the dam. The dam will look like a riffle, and will fit naturally into the landscape. When a series of such dams is built in a creek, it is even possible to run a boat up the stream, as a light boat or canoe can be lifted around or over the dam, and there will be plenty of water to float the boat between dams.

Dams in Small Streams

The greatest of stream improvement probably can be made in the tributaries, such as creeks and gullies. For a complete stream improvement, it is absurd to confine the effort to the main stream. The most important improvement can be done in the creeks that lead into it, and in dry runs and ravines. Every minor dam, from a couple of feet long to 10 or 20 feet long, built back from the stream in ravines, will help to keep a steady flow of water into

the main stream. Also the water entering the main stream will be clear, and the soil will be kept on the fields instead of in the main stream. Stream improvement is just as important to agriculture as to fishing.

This is not mere theory. In Brown County, in the Greenhorn Valley, the idea was tried. Not a cent was spent for materials, but some nails were used and there was some old house timbers in the valley. With these and slab rock and earth, 50 dams were built over a stream length of a little more than 2 miles. Some of the dams were very small, up at the heads of ravines. Some were possibly 20 feet long and were in the main streams. The result was that water holes were created for game, the soil was held in place, and through most of the year, Greenhorn Creek, which formerly was a dry run most of the year, is now flowing. When not actually flowing, there are water holes.

Wing Dams

In the main streams, wing dams may be better than dams that reach entirely across the stream. If there is a cliff of limestone or sandstone, a wing dam may be built from the opposite side, so it will throw the current against the cliff. Such a dam will hold back a few inches of water, increasing the depth. This of itself may be a great improvement in a stream. If water is less than knee deep to the average man, it may not be deep enough for bass fishing, but water that is deeper than knee-deep, is deep enough for bass. So a few inches of rise in a stream may make the difference between no bass fishing and good bass fishing.

Wing Dams should be built so they will look like a part of the landscape. Logs may be used, and these should be well anchored, and then, if possible, covered with stone or gravel. An engineer should select the location, as he will know whether the current will wash out the construction.

The wing dam has many advantages. It lets the water flow through over part of its natural bed. It gives room to get a boat or canoe through. It makes it possible for a fisherman to wade through. It does not completely obstruct the stream and cause a pocket of dead water; and as a result of this, the dam is not so likely to silt full and become useless or become a mud hole. As time goes by, it is likely that streams will be used more and more for boating and canoeing, and dams should be constructed always with this in mind.

Hindrances to Dams

One of the chief hindrances to proper dam construction is silting. In the corn belt, soil washes from the fields and into the stream. Where the water becomes still, this silt drops to the bottom in the form of mud and a dam may thus create a mud hole.

In parts of southern Indiana, where there is much shale in a stream, the still water behind a dam quickly washes full of shale gravel and slabs of rock. In such a location, a wing dam may be much more useful than a complete dam.

Lopping, Logs and Stumps

Some fishermen, especially in southern and central Indiana, have practiced cutting trees so they lop over into the water, later fishing about the tree tops. This is a very practical kind of stream improvement and can be practiced along almost any stream, large or small. This is what you can do: Get the permission of the land owner to cut some of the trees so they will fall into the water. Cut the tree partly in two on the side away from the water. Then push the tree over so the top is in the water. The tree will thus be anchored to the bank and will be permanent for years. The branches make a good fish harbor. If this is practiced, however, a number of trees should be lopped, as the fish should not be centered in just a few places.

Stumps and logs and log jams should not be removed, but should be allowed to remain as nature places them. These always make good fish harbors and encourage many forms of fish food.

Extent of Improvement

Thousands of dams and other stream improvements have been put in throughout Indiana. Some are good, some bad, and some probably have reduced fish life rather than increased it. Some of them have changed the species of fish; that is, sluggish catfish waters have been created in many places where there should have been current for bass and rock bass. But, on the whole the work has been beneficial, especially to agriculture, and it ought to be continued.

Thousands of miles of streams can be improved. If this improvement is done with careful attention to all side gullies and little tributaries and dry water courses, the benefit to agriculture alone would pay the cost. At the same time, fishing waters would be clearer. In stream improvement we tie in these things: Agriculture, fishing, boating and canoeing, and, in the time to come, hiking, camping, drought prevention and flood prevention will be included. It is a constantly broadening field.

ICE AND ITS IMPORTANCE TO FISH LIFE

Ice at the surface of the water keeps out the air from above, because it serves as an impervious coat and acts the same as oil. The stirring action of the winds is also eliminated due to the surface ice and as a result prevents the normal circulation and proper aeration of the water, which is essential to fish life. Each spring and fall there is a complete overturn of the water, due to the winds and inequality of temperature that adds oxygen to the water, but in the winter this is prevented because of the thick coating of ice.

Fishes, crayfishes and all other aquatic animals give off waste materials into the water; these include such gases as carbon-dioxide and nitrogen. Such substances are toxic to fishes and other gill-breathing animals and if the accumulation of these poisons is great enough, death results. This, coupled with decomposition products such as ammonia and hydrogen sulphide and the utilization of the dissolved oxygen quickly kills fish and other gill-breathing animals.

At the same time the oxygen necessary for respiration is being slowly consumed by the fish, and in time the tension will be insufficient for breathing. When this point is reached the fish

will die, because an excess of carbon dioxide, together with a decrease in oxygen content is quickly fatal to practically all fishes.

Experiments prove that the carp and bullhead catfish are very resistant to adverse water conditions. The yellow perch, rock bass, croppie, minnows, large and smallmouth bass, suckers and darters rank next in the order named. The brook silversides is at the top of the list and is the least resistant of all fishes studied.

Owners of farm fish ponds are advised to cut the ice or the fish may die of suffocation in the shallow water. Each spring, after the ice melts, large numbers of fish may be found floating at the surface and in most cases this is due to the winter stagnation of the water, because the ice is not kept cut. The accumulation of dead fish during the winter months may also float at the surface at this time. A current of water from a spring or stream will aid in the aeration and circulation of the water which is essential for fish life.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

STATE FISH HATCHERIES.

Location, Size and Equipment.

To the wardens, we may say there are six major fish hatcheries. In all 11 hatcheries are now operating, but at only six of these will there be extra supplies that may be of assistance to wardens.

The major hatcheries are Bass Lake, Wawasee, Tri-Lakes, Riverside, Avoca and Lincoln City. At these wardens may find equipment that may help them in their work. The other five hatcheries are at Pokagon State Park, Pendleton Reformatory, Brown County Game Preserve, Shakamak State Park, and Scales State Forest.

Wawasee and Tri-Lakes always start their activities earlier than the others, as they hatch wall-eyes and ring perch. Wawasee and Tri-Lakes are cooperated closely in operation, and Tri-Lakes operates the small ponds at Pokagon.

Riverside has general supervision over all southern Indiana, and has a closer cooperation with Avoca and Shakamak, and operates the hatcheries at the Reformatory and Brown County.

The number of ponds, and aggregate pond areas for the various hatcheries follow:

Name of Hatchery	No. Ponds	Total Acreage
Wawasee	27 & 6 Display	10.05
Riverside	33 & 9 Display	14.79
Tri-Lakes	8	5.62
Bass Lake	13	5.08
Pendleton	2	.44
Avoca	15	5.70
Lincoln	5	2.57
Scales Lake	10	5.42
Pokagon	5	.30
Brown Co.	2	.97
Shakamak	4	2.00

All of the hatcheries raise such fish as bass, bluegills, and rock bass. To these may be added a few ponds of red-eared sunfish, crappies and a few channel catfish.

The hatcheries can be of great service to the wardens, and if wardens will visit the hatchery foremen at the major hatcheries, become acquainted with the work and equipment, they will learn in what ways the hatcheries can assist.

STATE FISH HATCHERIES - 2

Hatchery foremen often assist wardens in inspecting locations for club fish ponds. Hatchery foremen often assist with fish rescue work. They often lend equipment, temporarily, to wardens, but insist on a receipt. Wardens who borrow any kind of equipment should be very careful to use it properly, not damage or destroy it, and return it promptly. If hatchery foremen are busy with other work that requires their attention at the time, they can not be expected to leave it, but they are to assist the wardens whenever possible. Wardens may also call on hatchery foremen whenever they need special assistance in warden duties, such as license checking, in the region about the hatchery. The foremen will be subject to calls for cooperation at any hour, day or night.

Wardens have been of great assistance to the hatcheries. They have helped to obtain large numbers of display fish and aquatic animals. Often they have actually come to hatcheries and assisted the hatchery crews at times when assistance was very seriously needed for hatching fish, transferring fish or taking fish from ponds. Very often, wardens have assisted with obtaining parent stock very seriously needed at the hatcheries.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

TROUT IN INDIANA

Hundreds of thousands of trout have been planted in Indiana in the last few years. Some of these probably have been wasted. Nearly all of the trout were planted when so small that many probably were lost. Some of the waters may not have been suitable. But it is known that trout are actually being caught in waters that have been stocked, and there is evidence in some localities that trout have reproduced.

No one knows certainly about the suitability of some streams for trout. Everybody would agree, for example, that the Wabash River is not a good place for trout; it is too warm and too muddy. But who can say that trout will or will not survive and even reproduce in the northern Eel River, say from Liberty Mills to Roann? It is definitely known that trout have been caught from this stream, and it is a fact that many pools are uncomfortably cold even in the heat of summer. The stockings of trout in the Eel and its tributaries have been relatively small.

The only test of any questionable trout water is the actual trial. A little experiment is worth a vast amount of theory. Water temperatures, though important, are not the whole story. For example, there may be cold spring pools where trout can stay during warm weather, spreading to other waters when the other waters cool. This is not theory but is the actual experience of trout fishermen. For example, there are lakes in the Algoma district of Ontario where trout concentrate in the summer. They seem to travel up the small creeks and up waterfalls to get into these lakes. In the early spring, the waters of connecting streams will be alive with trout, but as the streams shrink, the trout also disappear, and the large trout and most of the smaller ones will be found in the spring lakes. When feeding, the trout in some of these remote lakes will rise like a shower of rain. One lake seems to hold trout enough to supply many miles of stream. So a few miles of cold water may mean many miles of spring trout fishing. Such is known to be the case in Chippewa and the Michipocoton valleys of Algoma, and it may also prove to be the case in Indiana. It is of the greatest importance, when considering trout, to take the migratory nature of the fish into very careful consideration.

In Indiana we seem to have had examples of this migratory nature of trout. One example was Potato Creek, into which there seemed to be a spring run of rainbow trout from the Kankakee River every spring. Rainbow trout are caught occasionally from the Kankakee from as far down stream as the Kankakee Game Preserve.

There is also the possibility that we will develop a strain of trout that will adapt themselves to warmer and muddier waters than those in which trout ordinarily are found, and which will spawn under our conditions where trout have not spawned before. Nature has a way of keeping life and perpetuating it, even under trying conditions. We know that some trees will grow beyond their natural range; we may expect the same thing of fish.

Nature does not go by state lines. We may believe that trout do not leave off naturally at the Michigan state line. But it is

natural to get out trout plants as far north as possible, provided the water is suitable. Yet there may be some waters in southern Indiana that will harbor trout.

For years there have been brook trout in the streams that come from the caves at Spring Mill State Park. They were planted there. In 1936, more trout were planted there. A few also were planted in the stream that comes from a cave in Speed Hollow, Lawrence county. It is hoped that, in the cool waters of spring, the Speed Hollow trout will work down into larger waters, migrating back to Speed Hollow when the waters in the larger stream become warm.

A small plant of trout has been made in Clinton county and for two years minor plants have been made in the Salamonie River near Warren.

Nearly on the Allen-DeKalb county line, plants have been made in Willow Creek, a tributary of Cedar Creek. Plants have been made in Steuben county, in tributaries to Lake James and in Pigeon and Fawn Rivers.

Plants have been made in all the northern tier of counties excepting Lake county, and in many of the streams that flow into the Pigeon, Fawn and St. Joseph and Elkhart Rivers trout have been stocked and some of these streams annually yield good catches of trout. LaPorte county annually plants trout in the Little Kankakee and it is one of the best rainbow streams in the state and is reputed to have tackle-smashing rainbows. Other streams tributary to the Kankakee have been stocked in the last three years. One of these is Eagle Creek in Starke county.

Some of the cold tributaries to the Tippecanoe River have been stocked with rainbow. The rainbow trout likes big waters, either lake or stream. The brook trout gets up toward the heads of streams. The rainbow goes down stream. It is hoped that the rainbow from the tributaries will work out into the Tippecanoe River when they grow to size, and that they will offer some spring trout fishing when the season is closed on bass. The Tippecanoe tributaries that have been stocked are in Noble, Kosciusko, Marshall, Fulton and Pulaski counties.

In Marshall county, tributaries of Yellow River and the Kankakee have been stocked.

Most of the spring-fed streams flowing into the northern Eel River, from Logansport nearly to Larwill, have been stocked with trout, with the hope that these would work their way into the river and yield some spring trout fishing.

Some of the wardens make reports when trout are caught. All should do so. It is of the greatest importance to know where the trout are doing well so that we will know where to stock them without wasting fish. It is also important for wardens to report creeks in which trout are seen. It may be that we will have some surprising reports on trout in the next two or three years. By all means these facts should be sent to the office so that we can get more trout for Indiana waters.

As you probably know, Indiana does not produce trout in hatcheries. The trout that come to Indiana are from the Bureau of Fisheries. The Bureau does not wish to waste fish, and the reports of wardens on trout catches and trout observations are sent to the Bureau.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

Fish Rescue: Warden's and Department:

One valuable phase of the work of the Division of Fish and Game is that of fish rescue. During the summer months, when streams are drying up and when pollution becomes more evident, a great number of fish are left stranded, and thousands die. Wardens can do a great amount of good by removing the fish from affected streams, and placing them in water which is not contaminated and which will not be lowered by dry weather. For the past few years the Division, and the wardens have done some of this work, but it could be carried on much more effectively, and the number of fish and fishing conditions increased proportionately. To give you a more concrete example of the effectiveness of this operation, last year's fish rescue totals are included. The total is not as great as it would be if all wardens had sent in complete reports.

Results.

From March until October, in 1936, approximately 275,000 fish were rescued. Of this number about three-fourths were game fish, the rest being coarse fish which were destroyed. The ultimate effect of this work will be realized when we take into consideration that of the game fish, about 35% were large enough to spawn this year. From these rescued fish have come countless thousands of young fish; exactly how many it would be hard to estimate, but probably as many as are distributed from the hatcheries. It is not an expensive operation, but undoubtedly it is extremely worthwhile, and should be encouraged as a club project.

Fish Rescue Crew.

During 1937, as in the past, one truck and a competent driver will be assigned to fish rescue work. The truck will carry complete equipment, including cans, and seines, and will be available to any warden needing assistance. There are times when it is impossible for us to fill all the requests for the rescue truck, and then, insofar as possible, other trucks from the hatchery nearest the scene of operations will be utilized. The warden is urged not to call for the fish rescue truck excepting in cases which he cannot handle the job with his own equipment.

Warden's Equipment.

Wardens will be furnished with small mesh seines, in lengths from 12 to 50 feet. These seines can be borrowed from the hatchery nearest your territory, or from the office. Those of you who have them at the present time are requested to keep the ones you have and not ask for another until that one is no longer serviceable. It is necessary that each warden in possession of a seine, try to keep it in good condition, and use it as carefully as possible, as this type of equipment is expensive and requires a good deal of time to make.

Daily Report.

Upon completion of any seining operation, the warden should report the following to the office, in the form of daily reports. These reports should be separate, and addressed to Mr. A. E. Andrews, Supt. of Hatcheries, 406 State Library Bldg., Indianapolis. Heading: Fish Rescue Report:

Date:

Warden:

County:

Number of fish by species:

Total number of fish:

Stream or lake from which fish are taken:

Stream or lake into which fish are placed:

Assistance: (club member, land owner, other warden, fish rescue truck)

Great care should be taken in handling the fish, or the work will be wasted. In the summer months when most of this work is going on, it is very hot and all species are less resistant to handling. Following are some things to remember in handling fish at any time.

Never pick up a fish with dry hands.

This is a sure death warrant as far as the fish is concerned and is also a sign that the warden doesn't know his onions. If you are handling large fish, it is a good idea to take about a yard of soft cloth (an old blanket works very well) and string it up between a couple of sticks, making a blanket net. This eliminates the danger of the fish flopping out of the hands, and also reduces the danger of bruises from the tight grip necessary to hold them. Large bass can be held by grasping the lower jaw with the thumb and forefinger. If you are going to handle a large number of fish, it will ease the wear and tear on your thumb if you wear a pair of cotton gloves or tape the thumb. N

Never over-load the cans.

This is a common mistake in any season, and in the summer it is outright murder. Two ten inch bass in ten gallons of water is about right for summer days if the distance to be traveled is not too great. One or two inch fish can be carried 250 to ten gallons of water, depending on the distance and temperature. Remember, the hotter the day, and the longer the distance, the fewer the fish per can. Bass, Rock bass, and bluegills handle fairly well, but crappies, silver bass, and White perch are especially affected by handling and hot weather.

Fish to be transplanted.

In disposing of game fish be sure that the water in which you place them is of approximately the same temperature as the water from which they are taken, and be sure that it is a stream which will not dry up later on. The only fish which should be planted in other streams or waters are the various species of game fish, and any food species, including most suckers and minnows. Coarse fish such as carp, quillback, buffalo, shad, dogfish and gar, should be disposed of in any way you see fit with the exception that large fish of any of these species are sometimes needed for display purposes and should be saved until they can be picked up by a truck from the nearest hatchery. In case you do find it possible to get any of these large show fish, wire the office, stating species, size and number and address at which fish are being held. We will wire you back whether or not to hold them. In case we need the fish a truck will be dispatched immediately to pick them up.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

Club Rearing: Fish

A conservation club activity which has been particularly successful wherever tried, has been the operation of club operated fish rearing ponds. The popularity of this one important phase of the conservation program may be gained from the statistics showing the number of clubs cooperating in this work. In 1934 it was expected that about 48 clubs would sign fish rearing contracts. The department agreed to furnish the fry with spread plants from the state hatcheries. Instead of the expected number, 81 clubs signed contracts and the department experienced difficulty in furnishing the fry requested. The next year the regulations were changed to provide that clubs were to procure their own parent stock, and 154 clubs signed contracts. Last year, 1936, 172 clubs operated fish rearing ponds under contracts and 2,485,185 fish were placed in Indiana waters from club hatcheries. The record speaks for itself, in three years the clubs were operating 570 ponds with a water area of over 240 acres.

Program Popular

There are two reasons for the popularity of this work. First, to own and operate a club hatchery gives the club some tangible evidence of its accomplishments. The members as well as the others in the community can actually see that the club is doing something constructive. Members take a great deal of pride in club ponds, and still more in the knowledge that they are doing something which will improve fishing conditions. Creation of such a feeling on the part of club members is a great help in cementing the club together, and in making it a permanent organization. It is also a means of increasing the scope of the clubs as we shall see a little later.

Payment Under Contract.

The second reason for the widespread acclaim given this activity is that the clubs receive payment for the fish they raise and release in their own territory. An equitable scale for the different species and the varying sizes has been worked out by the department and is included in the contract, which must be signed and its stipulations adhered to, before payment is made. Many clubs have attained the maximum in payment, which has been set at \$500.00 for any one club and the money raised in this way is generally put back in some other worthy club activity. Worthy conservation activities vary widely. In some instances it might mean a free banquet at which a large number of people can be contacted, the membership of the club increased, and the other activities of the department and club brought to light. However, most clubs put their money in some project such as spot plantings, winter feeding, lowlog dams, other stream improvement, reforestation, or a club owned park.

Club Rearing: Fish # 2.

How to Get Contract.

To procure a fish rearing contract, the club is required to write the office, % Mr. Andrews, Contracts will be mailed immediately and these should be filled out by the club officers and returned to the office at once. This will give the department time to look over the ponds for which the club is securing the contract. A man from the office generally checks over all new ponds to see that everything is being handled for the best interest of both parties. After the investigation has been satisfactorily completed, one copy of the contract is returned to the club and one is retained by the office.

With the signing of the contract (copy attached) the club should immediately make plans to secure its parent fish, if these have not been carried over from the previous year in winter ponds. Here is one way the warden can help a club but he should see that the fishermen members do most of this work.

They go out with their rods and reels, have lots of sport, and provide the necessary breeding stock. Naturally the fish have to be handled carefully. But a hooked fish is not a dead one unless he has been roughly treated. If the fish has swallowed the hook, cut the line off short and forget about it. The fish will get along all right.

Hatchery Operation.

The club hatchery can be operated much in the same way that the state hatcheries function. Local conditions may cause some variation, but in general by adhering to the following procedure used in the state hatcheries success may be had.

Near the close of the hatchery season, wardens and club officials are notified of the time for removal of the fish. They may be taken out at an earlier date, if the club desires, but the warden must be present when the fish are counted and, if possible, do the counting. Do not estimate the number of fish. As they are taken out of the seine and placed in cans they should be carefully counted according to size. So many number 1's, so many number 1½'s, so many 2's, 3's, and so forth. Immediately after planting, both the warden and the club are asked to report the number and sizes of the fish raised. The warden's figures are a check against those of the club, a state requirement. As soon as the reports are received in the office, vouchers are sent to the club to be filled out and returned. This is absolutely necessary if the club is to receive payment for its fish. After having been properly filled out and returned to the office the vouchers go to the Treasurer of State, the checks are made out and immediately forwarded to the club.

The disposition of the fish is left entirely up to the clubs. It is hoped that they will put the fish in places where public fishing is permitted, and where natural conditions for the growth of the fish seem to be best. If this is not done, the warden should make a complete report of the plant. The ordinary rules and procedure of planting from state hatcheries should be followed when handling club fish.

Reason for Regulations.

There have been occasions in the past where clubs have taken advantage of the department, in its club fish rearing program.

Unfortunately, there is a tendency on the part of some clubs to consider this work purely from the financial viewpoint, as a money raising project. This must be discouraged. For wherever this attitude is upper-most in the minds of the majority of members in the club, a lot of chiseling goes on. Accordingly, it has become necessary to formulate rules regarding ownership and use of club ponds. If one club is operating a pond or group of ponds, no other club or individual is allowed to use any of these ponds without specific authorization from the office or until the warden makes a thorough investigation. If one club has more fish than necessary to reach the maximum payment, it must plant the excess instead of turning them over to another club or individual. In other words, a club is paid to participate in this work and only for those fish which it actually raises. The department insists upon accurate descriptions of the ponds and their locations. This information is essential to the office. We must keep the records complete and up-to-date.

Water Supply.

In attempting an activity of this nature, clubs must be very careful about one factor. It is so important to the success of rearing fish that it might be divided into three parts. Fish must have water. That sounds simple, but a lot of clubs have overlooked this prime essential. There have been several instances in which clubs apparently were trying to grow a new species of bass, one that could live in air, or perhaps fly, so far from a suitable water supply were their ponds located. A good water supply implies three things. First a supply of water which is constant. One which does not fluctuate greatly at any time during the year. Then, there is just as much danger from too much water as there is from too little. A flood will allow your fish to escape, and pond reared fish are pretty hard to count when they are swimming around a half mile or so downstream in some creek. And its just as hard to count fish which have been left high and dry in the summer when the well or spring suddenly gave out. So be sure that your clubs have plenty of water, and be equally sure that there is not too much. Then be absolutely positive that the bottom of the pond will hold water after it is put in. We have sections, such as the limestone sink areas near Bedford, and the gravelly regions of north central Indiana, in which ponds are pretty hard to construct simply because they can't be made to hold water. So remember, plenty of water, but not too much, and something to put the water in is important.

If there is a technical question in the minds of the club officers, or the game warden, relative to the type of bottom, water supply, etc., the department will be glad to send trained men to help you with these problems.

The Engineering Division, the Division of Geology, and the Fish and Game Division can often be of great help to clubs contemplating the construction of fish rearing ponds.

Selection of Fish.

Over most of the state, clubs rear fish of the bass family. Others go into Bluegill, Red-ears, or Rock Bass. Up north there are a few clubs which rear trout. In most sections of Indiana this would be impractical, for even if the club has access to a cool spring they have no place in which to plant the fish which they raise. Trout rearing differs from the rearing of other fish chief-

Club Rearing: Fish # 4

ly in that they require more attention and money. It is necessary to feed the trout, whereas in bass ponds just let nature take its course. Wardens should encourage the clubs to stay with the warm water species but if a club desires to have a try with trout the department will endeavor to cooperate.

These are the things you, as wardens, will be asked about. Encourage fish rearing wherever possible. This will change the attitude of local sportsmen, will better local fishing conditions and will be a great help to the organization which sponsors the work.

COUNTY _____

CLUB _____

THIS MEMORANDUM made and executed in duplicate this _____ day of _____ 193____ by and between the State of Indiana, Department of Conservation, Division of Fish and Game, hereinafter called the State and _____ hereinafter called the Organization.

WITNESSETH:

Whereas, the State desires to have produced and distributed a number of black bass, bluegills and rock bass in the waters of this State and,

Whereas, the State desires to encourage the raising of game fish by clubs and organizations,

NOW THEREFORE IT IS AGREED, That the State shall pay the Organization for hatching, raising and distributing black bass, rock bass and bluegills on the following terms and conditions:

1. (a) PRICE: The State shall pay at the rate of Twenty (\$20.00) Dollars per thousand for producing fingerlings of the largemouth or smallmouth black bass not less than three (3) inches in length.

(b) Thirty (\$30.00) Dollars per thousand for producing fingerlings of the largemouth or smallmouth black bass not less than four (4) inches in length.

(c) Forty (\$40.00) Dollars per thousand for producing fingerlings of the largemouth or smallmouth black bass not less than five (5) inches in length.

(d) Ten (\$10.00) Dollars per thousand for producing fingerling rock bass not less than one and one-half ($1\frac{1}{2}$) inches in length.

(e) Five (\$5.00) Dollars per thousand for producing fingerling bluegills of not less than one and one-half ($1\frac{1}{2}$) inches in length.

2. CONDITIONS AS TO PRODUCTION: The State shall approve all plans and arrangements for the production of fish to be raised and distributed under the terms of this contract. The State shall not be liable to pay for producing any fish under any arrangements made by the Organization to which the State has not agreed. The State shall be liable only for producing fish hatched in the Organization's pond or ponds from its own parent stock.

3. LIMIT TO THE AMOUNT OF FISH TO BE PAID FOR BY THE STATE TO THE SAID ORGANIZATION: The State shall not be required to pay to the Organization for producing fish under the terms of this agreement a total sum in excess of Five Hundred (\$500.00) Dollars for fish produced and distributed at the prices and conditions herein contained, nor shall the State be required to pay for producing any fish distributed later than the twentieth (20th) day of October 1937.

4. COUNT AND DISTRIBUTION OF FISH: When the fish mentioned in this contract are to be distributed, a representative of the Division of Fish and Game of the State of Indiana shall supervise the counting of said fish and the count shall be by size and number; and the Organization shall report to the State in writing the size; and the representative of the Department shall be present when the same are distributed by the Organization. The Organization shall report to the State the names of waters and the location of waters stocked and the size and species of fish stocked in each water. On receipt of a voucher signed by the proper officers of the Organization that certain fish have been raised and distributed according to the terms of this contract, and said voucher having been signed and approved by the representative of the Division of Fish and Game designated to supervise the counting and distribution, the Organization shall be paid the prices herein specified for producing the fish raised and distributed.

5. LOCATION AND NUMBER OF PONDS WHERE FISH ARE PRODUCED: The ponds or hatcheries where the Organization shall produce fish mentioned in this contract are located in _____ County, Township _____, Range _____, Section _____, and are _____ in number and have a total of _____ acres.

IN WITNESS WHEREOF the parties hereto have duly executed and signed this agreement the day and year first above written.

Contract sent Organization (Date) _____

STATE OF INDIANA
Conservation Department
Fish and Game Division
Kenneth M. Kunkel, Director

By _____

By _____
Secretary

Address

or

By _____
Secretary

Address

Contract completed by State (Date) _____

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

FISH PREDATOR CONTROL - CLUB SPEARING

Although the control of Fish predators has never been undertaken very thoroughly by the Division of Fish & Game, the Warden will find it useful to know something of the steps which have been taken.

In the hatcheries themselves the conditions are well controlled and with the possible exception of certain parasitic animals, the only predators to give cause for concern are those species of birds which rely upon fish as part of their diets. In general these are the herons, with the notable addition of the Belted Kingfisher and an occasional osprey. The kingfisher is by far the most common fisherman around the average hatchery. Once in a while the fish-hawk, rightly called Osprey, will adopt a hatchery and become a curb on production.

It should be remembered that the depredations of these birds become serious only when they invade a hatchery or pond in which there is a concentration of fish. Under natural conditions, such as those found in any lake, stream or pond, the food of these birds is varied, and they do little harm. In fact their value, as eaters of rodents, snakes and coarse fish, probably far outweighs any harm which they might do.

Prevention Methods

In some instances it is possible to check the depredations of these birds by installing wire over the ponds. A fine net-work is unnecessary, as most of these birds require a considerable horizontal space in which to take off. Strands of wire strung at ten foot intervals in each direction across the ponds interferes with their flight and are usually sufficient. The main drawback to this system is that the cost of installation in large hatcheries is prohibitive.

Control of aerial fish-eating predators in the hatcheries at present is carried on by killing the offenders. The number shot over the course of a year's time in all the hatcheries amount to approximately 350 birds of all species. A check of stomach contents is made with each kill. One kingfisher has been found with 15 partially digested smallmouth bass, from 3 to 4 inches long in its stomach. A green heron, killed at 11 a.m., had eaten 13 fingerling smallmouth. Many of the birds destroyed had eaten no fish.

Predatory Fish

Aside from the control of fish-eating birds in hatcheries, there is that far more difficult and less understood work of the control of predatory fish. Aside from the purely scientific angles of this question there are a multitude of practical problems which present themselves, and which complicate the work greatly.

It is necessary first to arrive at some conclusion as to just what fishes may be classed as predators, or at least coarse species. Should the buffalo, a valuable commercial fish, which is a type of sucker, and which as such, probably destroys some fish nests, be controlled? Should the shad, which occasionally

becomes extremely numerous, but which is one of the few fish not to eat other animal life, be made the subject of intensive, or even extensive control measures? To what extent should control of these fish be practised? What esthetic values do these coarse fish have? These questions, and a lot more should be answered, in the light of scientifically disclosed facts, with due regard for economic importance and with proper reverence for the respect the fisherman has for the fish before we condemn or condone.

As things stand today, without much of the needed information available, our fishes have been pretty well classified as to their good or bad habits. In general, the following fishes are said to be and for most purposes will be called predatory fish. The Dogfish, and Garfish. It is assumed that coarse fish are the carp, quillback, shad, buffalo, red-horse, and others of the non-protected bottom feeders.

Ineffectiveness In Large Streams

All of these fish inhabit our streams while some few of them are found in both lakes and streams. There is a great question as to the effectiveness of control work in streams which have an unbroken flow to the Ohio river. Large rivers will always have their burden of coarse fish and unless some barrier, dams, waterfalls, pollution, separates smaller streams from larger rivers, the complete and permanent removal of coarse fish seems to be as far in the future as a trip to Mars. For this reason it is well for the warden to consider the type of water carefully while contemplating control work.

Effective Work Done In Lakes

In those waters in which control seems practicable, the Conservation Department has allowed such work to be done. A notable example is the Cisco netting in several lakes in the northern part of the state. The nets are operated by conservation clubs and the fish are used by charitable institutions and for other non-commercial purposes. Although a relatively large poundage was taken in the early years of this work, catches in succeeding years have been smaller and smaller. Whether this indicates success in the substantial reduction of the Cisco population, or whether it means that the Cisco is becoming a wiser fish, has not been determined.

An attempt was made last year, and will be tried again this spring to seine certain northern Indiana lakes in an effort to remove the carp and buffalo, along with Gar and dogfish, under the direction of a commercial fisherman. Because of the bottom types and the lack of proper equipment the experiment was a failure. The plan included the sale of the commercial fish, with a percentage of the gross income going to the state to help bear the cost of supervision and to prevent possibility of a precedent which would ultimately lead to indiscriminate use of seines.

WPA Seining

A WPA seining project has been underway at Bass Lake for three years. During the last year, 1936, over 150,000 pounds of coarse fish have been removed, with the result that the lake has improved noticeably. The water has become less turbid, the vegetation more profuse, and the number of young game fish

greatly increased. Other seining projects of a similar nature were instituted in 12 northern counties last winter, but with freezing weather were postponed. They are expected to get under way in the near future, and doubtless will prove effective when the operators become familiar with equipment and the lakes to be seined.

Fish Rescue Crew

The Conservation Department makes no other organized efforts to control predatory fish. There are always times however when the usual machinery will not fit the occasion, and then the regular fish hatchery organization is called to work. In case there is a body of water needing some attention the fish rescue crew is called in and does whatever possible. Wardens having occasion to call on this crew are requested to write to the office, reporting complete details as to the area, depth and type of bottom of water to be seined, species of fish which are undesirable, and any other pertinent information. Suitable dates will then be arranged and the work done.

Club Spearing

In view of the fact that indiscriminate spearing on the part of the general public was condemned by the legislature in 1905, the warden is often plagued by questions relative to this phase of club activities. It is readily apparent to anyone familiar with fishing conditions, that the uncontrolled use of the spear or gig is not even remotely related to wise fish conservation. But it is also apparent, from results obtained in parts of Indiana that organized spearing has been a great forward step in modern conservation procedure.

Regulated spearing today, has become an integral part of the activities of many conservation clubs. In the localities where spearing formerly flourished with wild abandon as an illegal practice, it has now become an instrument of law and order. It might assume this same status over the whole state if the people, and the waters did not vary so widely.

Violations Reduced

In the northern regions where lakes are predominant and where fishing for coarse fish has never been much of a pastime, the issuance of permits by the Conservation Department to conservation clubs for supervised spearing has resulted in a greater respect for the fish and game laws and has made the work of the wardens easier and much more effective. Illegal spears have been turned over to wardens by the hundreds, confirmed violators have been converted, and many formerly disinterested people have become convinced that the Department actually means to improve fishing conditions, and are now lending their wholehearted support to the entire conservation program.

Very Beneficial To Lakes

It is difficult to estimate the number of coarse fish destroyed during the years in which this procedure has been followed, but a conservative estimate would place the figure at something like 100,000. Most of the fish removed were taken from lakes into which other fish cannot migrate. Once out, they are out

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for good. Continuous application of this method of lake improvement will result in better fishing in years to come.

Regulation

The permit under which these clubs operate includes the species which may be taken, specifies the number of men per boat, who the supervising officer shall be, the number of spears to be used, the disposition of fish taken, the waters in which the seining shall be done and the period for which the permit is valid. (Permit attached)

How To Obtain Permit

Permits for spearing may be obtained by clubs by writing to the Department. The conditions will then be investigated, both by the warden and field representative, who must sign the application, and if deemed advisable the permit will be sent to the club.

Except under rigorous control and special conditions, no spearing has been done in the central and southern parts of Indiana. It shall continue to be the policy of this department that no such work shall be undertaken without a thorough investigation of the territory, the water, and the attitude of the people. After such an investigation the department will issue a permit, if such procedure is deemed advisable.

Little Help To Streams

There are a number of reasons for this attitude. In the first place spearing is an impotent method of removing coarse fish from streams which flow uninterruptedly into the Wabash or Ohio Rivers. Most of the streams in the Central and Southern portions of the state are of this type. You could furnish every able bodied resident of Indiana with a spear, have them out on the creeks every good night during the year and the next spring after the high water, there would be as many gar, dogfish, etc., in the streams as there were before.

Fishermen Must Be Considered

The fact that there are a great many people who fish for carp and suckers in the southern and central parts of the state is something else to take into consideration. These people buy the right to fish for coarse fish the same as any sportsman does to go after game fish. Indeed, there is even some question as to which type of fisherman is the best sportsman. Certainly he who takes the coarse fish is as good a conservationist as the bass fisherman. At any rate these people buy along with the right to fish, the right to a just amount of consideration from the Conservation Department. To discriminate against them, by permitting the use of the spear on their type of fish, is public policy which neither this department nor any other should condone. Occasionally situations arise in which the "carp" fisherman is not present in numbers great enough to warrant serious treatment, and then it becomes a matter of weighing the various factors to decide. Over most of the central and southern part of the state, the coarse fisherman is not to be taken lightly. The warden will do well to cultivate the acquaintance of these people. They help pay his salary.

Spearing In Streams Causes Trouble

In some cases the warden will find his work complicated by club spearing. There will be those non-members who will question the authority of the Department to issue permits of this type. They will declare that they have as much right to spear as their neighbor, even if they have not paid dues to the local fish and game club. In many cases they will become so bold as to go out without the protection of the permit, flaunting authority.

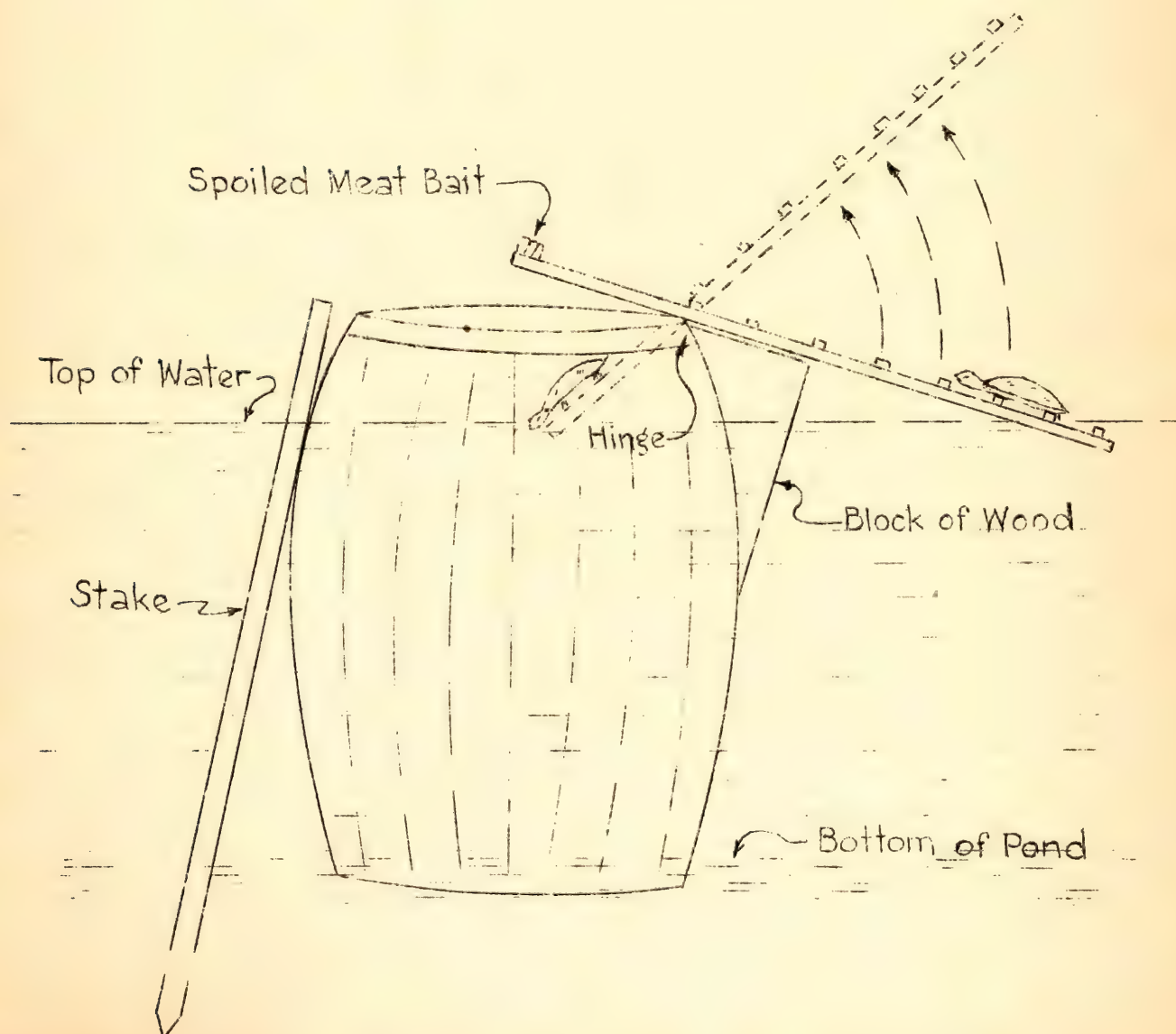
In localities where coarse fishing is a sport, there have been times and places in which the public support of the whole conservation movement, as well as for the club, has dwindled as a result of the issuance of a spearing permit. This effect is, of course, exactly the opposite in the lake regions. Occasionally people have resented the fact that certain individuals in a community, often not of the highest calibre, were allowed to do something which others in the community could not. However, this is a reflection upon the administration of the activity rather than the effect of the activity. Nevertheless it is something to think about.

One can only conclude that spearing is a beneficial activity only where natural conditions and the habits of the people will allow it to be. In the northern part of the state it has been effective. In the central and southern parts it is packed with dynamite.

UNIQUE TURTLE TRAP

Below is a sketch of one of the most effective turtle traps ever designed and is especially adapted for use in ponds and lakes. In addition to its effectiveness, it is one of the easiest traps to construct. Any ordinary water-tight barrel can be used. It can either be staked down or weighted with rocks or other weights. The board should be attached to the top of the barrel by a free-working ordinary strap hinge, and almost on a balance, so that when the turtle climbs up to get the bait, the end over the barrel will tilt, and drop him in the empty barrel. The other end will then drop back on a level with the water, ready for another victim. Cleats should be placed on the tilting board so the turtle will not slip off when climbing up.

The turtle is a great destroyer of fish eggs, and a great bait stealer. If you would have a good fish pond, the turtle must be removed. Fishermen! Here is your chance.



STATE OF INDIANA
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TRAINING SCHOOL

IMPORTANCE OF MUSSELS IN INDIANA

Practically every stream and lake in Indiana contains mussels. Mussels are bivalves. "Bi" means two. There are two shells to the outside covering. These two shells are hinged along a part of one edge, so they can be opened or closed. The shell is a protection to the mussel, who lives inside the shell.

Mussels are of great importance to wardens for two reasons: First, they are temporary parasites on some kinds of fish; second, they are sought by mussel diggers for their shells and pearls. Because unrestricted musseling would practically exterminate the mussels, the state has passed a law for protecting them by opening and closing streams and providing how and when they may be taken.

There are male and female mussels. A lady mussel may contain 75,000 eggs or a few millions, but all of these are needed if the mussel tribe is to survive; because a baby mussel of a certain species has to find a fish of a certain species to hang onto for a few months. Most of the young mussels perish because they do not find a poor fish to nab--and nab is right.

A mussel does not do much thinking. It has no head to think with. But it has a foot and it has reproductive organs in its foot and it lives well protected in its shell. The foot is the part that you see sticking out through the shell. With the foot, the mussel can move across the bottom of a stream or lake. Any one who has been around lakes or streams has noticed tracks on the bottom, as if some one had dragged a stick on the sand. At the end of this track you always find a mussel.

The mussel is a soft, mushy animal, but its body is divided into parts and each part has certain things to do. Its food is the plankton. Plankton are the forms of life that float in the water. The mussel lives largely on tiny plants so small that you would not notice them in the water. The water current will fan these through the shell, but if there is no current, the mussel has fine hairs with which to grab the water and paddle it through the shell. The mussel has a mouth for eating what it wants, and it has a digestive tract for digesting what it eats.

The lady mussel has ovaries which contain the eggs. The eggs pass out of the ovaries before they are fertilized. They are held in the gills of the mussel. They are fertilized there by sperm from the male mussel.

After being fertilized, the eggs are held by the female in the gills until they begin to develop shells. The things then are called glochidia, but it is useless to try to remember all these names. They are just baby mussels and each one has a shell more or less developed.

Now, not all mussels are males or females only. Some species are hermaphroditic; that is, one animal will possess both the male and female organs.

The interesting thing to you is what happens to these baby mussels when they are rolled out of the female mussel like tiny bits of sand to shift for themselves. They now have tiny shells, and in some species the shell is like a pair of nippers. If the shell comes in contact with a fish, it clamps down and hangs on.

If the fish is not the right kind for that particular mussel, the mussel has to let go and take a chance on finding the right kind of a fish.

The baby mussels that find the right kind of a fish to nab onto stay put. Some of them are in the gills of the fish and some are along the side and back of it. Just how the mussel digs into the fish is not very certain, but it nabs onto the fish by clamping it. It probably gets inside by some kind of chemical action that softens the scales or other tissue of the fish. At any rate, the baby mussel gets under the scales of the fish. It stays there until fall, probably, and then it drops off and begins the life of a mussel in earnest. So the things that people call grubs and worms in the smallmouth bass and rock bass probably are just baby mussels trying to get a start in life in the only way they can get a start.

Now, you don't believe this, because it has been told to some of you over and over and you sprinkle a lot of salt on the statement. So we refer you to the book called "College Zoology", by Dr. Robert W. Hegner, and to page 230. This is what the book says: "The glochidium probably chemically stimulates the skin of the fish to grow around it, forming the well-known 'worms' or 'blackheads'. After a parasitic life within the tissues of the fish of from three to twelve weeks the young mussel is liberated and takes up a free existence."

Some mussels are parasites on one kind of fish and some on another. Some get under the scales of the side and back; some get into the gills; some get on smallmouth or rock bass; some apparently get on ring perch and make small black spots, to which people seem to pay no attention. Many a good smallmouth black bass and many a good rock bass has gone into the garbage because people did not know that the things they thought were worms or grubs were just young fresh water oysters and harmless.

Inside the mussel you sometimes find pearls or slugs. Some of these will be very valuable and some will be useless. The pearls and slugs, however, are a source of much income and most of the musselers live in hopes of finding a pearl that will make them relatively rich. It is one of their gambles. Meanwhile, the shells of the mussel bring them an everyday income.

The man who lives by gathering mussel shells has a hard life but in many ways an enviable one. So far as his work is concerned, he can do about as he pleases. But he is subject to the dangers that go with the streams and the sea, and he must take the weather and is affected by the rise and fall of waters.

For the deeper waters he uses a crowfoot bar or dredge. It is known that mussels occasionally will camp onto fish hooks when men are fishing and will be drawn up on the bank in this way. So the musselers arranged bars that could be dragged behind boats. To the bars are attachments that come in contact with the mussel. The mussel grabs the attachment and is thus drawn to the surface.

Another method is wading the stream, when it is clear enough, and peering down to the bottom with a peep-box. The peep-box is merely a box that stops the wave action and gives the musseler an undisturbed space of water to look through at the bottom. When a mussel is seen, the musseler gets it with his feet or

hands. It is a hard job and subjects the musseler to much exposure.

The mussels are loaded into boats and taken to the musselers' camp, where the mussels are heated and killed and the shells allowed to open. The shells are then sold by ton weight to button factories. The factories stamp out the buttons that are so common on the market.

The state has found it necessary, for the protection of the mussel, pearl and shell business, to enact regulations and require licenses. The new laws on this subject will make the following provisions:

Licenses cost \$2 for a resident and \$15 for a non-resident; mussels cannot be taken from April 1 to June 30, excepting from the Wabash below Lafayette; the size taken shall be 2 inches across or more; only one boat shall be operated, and the operator shall have not more than four crowfoot bars of length not greater than 20 feet, and only two bars shall be in use at one time; a dredge for musseling shall not exceed a 3-foot opening and the prongs or forks of the dredge shall not exceed 4 inches in length; mussels shall not be taken from streams that are closed to musseling.

STATE OF INDIANA
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TRAINING SCHOOL

Laws of Fish and Fishing.

Laws affecting fish life are intended for two purposes: In inland waters, to perpetuate the fishes, to provide sport, with food as a second consideration; in Lake Michigan and other commercial waters, to perpetuate fish for food, with sport as a second consideration. The value of fish laws may be judged as to whether they accomplish one or both of these purposes.

All fish laws are restrictions. When the fish law does not say you can't do a certain thing, then you can do it. The law does not tell you that you can eat your breakfast, but until it tells you you can't eat your breakfast, you can eat it if you wish.

Restrictions are not a good thing except as they are necessary. You never would get good fishing by passing laws. The best code for improving fishing is found in the conscience and understanding of a conscientious and intelligent angler.

The law makes a closed season on most forms of sport fishing during May and the first 15 days of June. But the state has attempted to give the fishermen some fishing during this period by trying to develop trout streams where some spring fishing may be had during the season otherwise closed. The reason for closing the season on bass, bluegills, rock bass and the like is to give the fish a chance to spawn unmolested; to prevent catching fish from the nest or bed. But trout spawn either in the fall or very early spring; so they do not need the same closed season as bass.

Staking off beds where fish are nesting has been done for years, but intensively for the last few years. Some people believe that staking would be sufficient protection and that the rest of the water could be left open for fishermen, especially on lakes. Others assert that a man fishing in the night could not see the stakes, and that if all the breeding ground were staked, there would be no place to fish. They also say that fishermen would come in May and early June to a lake that is not protected during spawning season, but would desert it for protected lakes during the rest of the year. This is a question that only experience can answer. The law opening Beaverdam Lake the year around gives us an experimental laboratory.

The law limiting the size of hooks on trot lines is intended to give the smaller fish and fish with smaller mouths a chance to be caught with rod and line or pole and line. The law still gives the fisherman the right to set his trot lines so that he can catch catfish.

The size limit is put on fish with the idea that any fish legally taken may have spawned at least once. If we could be sure that every fish had spawned two or three times; that there was an abundance of food and good protective cover in the waters of Indiana, we would find no need to plant fish. The natural increase would take care of the supply.

The bag or creel limit is placed so that fish will not be depleted by the meat fisherman, depriving the sport fisherman of his recreation.

The limit was taken off ring perch for this reason: It is believed that perch in some of our lakes never would get large; that they are a strain of small fish, just as a Jersey cow is a strain of small milk cattle; that these little perch should be reduced in numbers and perch from larger strains should be planted. If this theory is correct, a gradual improvement can be made in perch fishing. The experiment is now under way.

The limit on wall-eyes was reduced to 10 inches to give fishermen a chance to take saugers. These two fish look so much alike that fishermen have been putting saugers back in the water. Saugers never get so large as wall-eyes. Saugers have greatly increased. The 10-inch limit will give the angler a chance to take and keep both kinds.

The law on ice fishing provides that the angler shall use only two poles and fish in not more than two holes at the same time. This law is a concession to those who would prohibit all ice fishing. At times this law undoubtedly prevents undue slaughter of fish.

In Indiana, the law says you can not buy, barter or exchange game fish, including the bass. This law says you can not offer to buy these game fish. This law draws a distinct line between commercial fish and sport fish. Some commercial fish, such as wall-eyes and ring perch, are also game fish, but the law does not prohibit the sale of such fish for the reason that they are caught and sold by commercial fishermen, and they form a staple food commodity in the market. It would be unreasonable to permit such a fish as the bluegill to be bought and sold.

A law provides that on petition a stream may be closed, wholly or partly, where trout have been planted. The closed term extends for three years. The idea of this is to give the young trout a chance to grow to maturity and to reproduce. Closed streams usually flow into other streams, to which they act as feeders. For example, Troxell creek, in LaGrange County, is a good brook trout stream, and the writer has taken trout there and has seen others taken from it; but it was closed a few years ago to act as a feeder to Pigeon River.

The law closes the season on trout from September 1 to May 1. This gives the brook and brown trout a chance to spawn in the fall, and gives the rainbows a chance to spawn after the ice goes out in the spring, before the season opens. The open season on trout makes some fishing for the angler who can not, at that time, go bass or bluegill fishing, just as catfishing in southern Indiana gives the angler a chance while waiting for the legal season to open.

The fish ladder law was written to provide a means for fish to get over a dam. A dam acts as an unnatural obstacle, excepting in time of high water. The obstacle prevents the fish from migrating upstream in the spawning season. So the law requires that a fish ladder, of a type approved by the department of conservation, shall be constructed at every dam that is more than 4 feet high. But the higher you raise a dam, the farther from the dam is the foot of the fish ladder. When the dam stops the fish, the ladder is not available to help the fish over the dam. Some fish do find the dam and get over it, but many others never find it. The law partly solves the problem, but not wholly solves it.

The law also requires that enough water shall be maintained above a dam for fish life, and enough water shall be let through the dam to maintain a constant flow of water. The purpose of this law is to prevent leaving fish nests high and dry on the bank, and to let water enough through the dam to maintain fish life below. So long as streams are used to produce water power, however, there will be some fluctuation above and below and especially below. Whether this amounts to more than the natural rise and fall of the stream because of rains and thaws is a question no one can answer definitely. One point is clear, however: The rise and fall below the dam comes at shorter intervals. On the other hand, the production of power is an important use of streams.

The law to prevent the removal of weeds was intended to prevent robbing lakes of natural vegetation to the detriment of fish life. The law requires a permit for taking vegetation from any lake in Indiana. Most fish do not feed extensively on vegetation, but insects that are good fish food are found on vegetation.

A law provides that during the closed season no power boats shall be operated on lakes of less than 325 acres. The purpose of this law is to prevent the wash along the lake shore, which might destroy or damage fish beds.

Fish laws do not touch all cases and conditions nor can laws meet all emergencies. So this lecture closes with the idea given at the beginning: That the best code of fish laws is the code of an intelligent sportsman's own conscience.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

Game Management

To understand the practice of game management, either contemplated or now in use in Indiana at the present time, it is necessary to understand the related factors which make this action advisable or prohibits the use of plans which have been used in other states.

All of us know that the numbers of sportsmen are constantly increasing, making further demands upon the area available for fishing and hunting. This necessitates, of course, that we make the available area more productive of fish and game. To do this job it is absolutely necessary that we receive the co-operation and support of the landowner who often times in the past has been abused, his property destroyed and his feelings outraged by the careless sportsman who is thus destroying the sport of many of his brothers for the future. I am glad to say that this feeling is not as prevalent in our state as in many of the other sections of the country. To prevent this feeling from existing at all in our state is one of your jobs.

In this country we have a system, the basis of which is the right of private ownership. By that right the landowner controls who and who shall not enter upon his grounds and within the boundaries of that right are we dependent upon the landowner for the enjoyment of the sports of fishing and hunting. There is another basic provision in our general setup which is that the right and title to all wildlife remains in the state. As a Department of the State administration and representing the people of the State the custody of the fish and game in Indiana is in our care. We hold this right in trust for the benefit of all the people of the state. We extend the privilege for a fee to a certain class of people to take fish and game at certain times of the year under certain rules and regulations. This is a privilege enjoyed by all who pay a license fee and the proceeds received by the Department from the sale of these licenses replenish and protect the wildlife of the state. We are primarily concerned with the taking of fish and game for sport with the exception of the commercial fisheries of the great lakes, which are handled in a somewhat different manner by this Department.

We have approximately 350,000 license buyers in the State of Indiana. We have no public hunting area in the State of Indiana. It is evident then, that the license buyers must enjoy their sport upon privately owned lands which means that under our laws, permission is necessary to enter upon such lands. It is our responsibility to educate the license buyers to follow the law in securing permission to hunt and fish; to comply with the rules of good sportsmanship; and to protect the supply of both game and fish. It is our responsibility to regulate hunting and fishing for the benefit of all and see that both fish and game be taken in such numbers and at such times to prevent

depletion. To maintain the supply of game we must furnish it with a suitable place to live which means that we must preserve a sufficient breeding stock at the end of each open season, that it is properly taken care of during the winter and that its habitat is of sufficient quantity that the game is enabled to propagate and exist naturally. To make Indiana attractive to fish and game is our problem of management. Added to this problem is the tendency of not only sportsmen's groups but of the Department itself to constantly add restrictions to those already in force.

It has always seemed to me that the average conservationist to prove himself such must advocate further protection of wildlife or a closed season. Many times have all of us noticed this tendency and no doubt have known in our own mind that further restrictions would not solve the problem.

The taking of fish and game for food immediately relieves this Department of the responsibility of replacement and in the final analysis places that responsibility upon the state as a whole for the replacement of the supply and it would naturally follow that funds for this purpose should come from the general fund of the state.

It is only reasonable to think that because the license buyers of the state pay for the protection, preservation, propagation and introduction of wildlife their desires and wishes should be considered in the management of the wildlife resources of the state. This Department is the only protective agency of the State Administration not only for the protected species of game birds, animals and fish, but we also act to protect the non-game species.

In Indiana I hope it will always be possible for the man who lives in the city to find a place to hunt in the country. To destroy free hunting in our state would be to end a period in our history under which the finest type of citizenship was developed. To restrict the sport of hunting to a favored few who, by accident of birth or special advantages, could either possess land or buy the privilege of hunting upon such land is a condition which I should certainly dislike to see imposed upon Indiana. It is your duty as a part of this Department, to discourage any movement which will tend to destroy this principle of free hunting. Free hunting can be continued in our state if there is cooperation between the man who wants to hunt; the man who owns the land upon which the game is found and the State as represented by the Conservation Department, who owns the game which is hunted. We do not encourage the posting of land but we do encourage and should insist upon every sportsman asking permission before entering upon the lands of another. It is easy to influence the farmer against the "city dude" who dresses in fine clothes and carelessly claims for his own that of which the farmer feels he should have a share. It has been the history of this country that class and professional prejudice is easily aroused. That is the reason that the organization of farmer groups is easy, especially when the sportsmen as a class are described as

destroyers of wildlife. The sportsman is entitled to the credit of being the protector of wildlife as it is he who pays your salary and it is he who pays for the winter feeding and for the new species which are introduced in our state.

To encourage landowners to post their land deprives the real sportsman of the opportunity of recreation and does not prevent the violator from continuing as he always has in the past. We are thoroughly sold on our educational campaign and no one is working harder than this Department to bring the landowner and the sportsman together. We have thousands of farmers enrolled in our conservation clubs and taking an active part in accomplishing our conservation program for this state. This educational campaign and the idea of working together is much better and productive of more lasting results than could be accomplished by the prohibition of hunting.

Some of the factors which have been responsible for the decrease of our game are--first, more intensive cultivation with the clean fence rows and the utilization of waste areas which accompany it. Second, over-grazing and spring burning of roadsides, fence rows, etc. which destroy nesting cover. Third, the construction of good roads which make the hunting areas easily available to many heretofore unable to reach them. Fourth, is of course, the destruction of our marshes and water areas for our waterfowl and the pollution of our streams and lakes for fish life. Some of the above can be corrected but we can not hope to restore primitive conditions nor to ever again have the abundance of game and fish life that we once had. None of us wish to go back and lose the advantages of intensive cultivation of land with its attending prosperity and rise in the standard of living for those who till the land. We hope by education to merge the present day methods of farming with a few simple practices of game management in such a way that both will benefit. In planning management of any area it is necessary to keep in mind that the expenditures for any plan must not be excessive and the plan must not conflict with the successful farming of the area. Lands which have gullies, wasteland and wood patches for natural advantages should be utilized in any plan.

The actual mechanics of game management are simple. All authorities agree that the destruction of the natural habitat of game is responsible for its decrease. The improvement of that habitat so that a given area will produce more game is the result sought by game management. Perhaps it is a misnomer to call it game management as it should be called land management or utilization. The best game management agency is nature as she will quickly restore to game fertility land which is not now productive of wildlife. In all your game management projects try to work with nature instead of against her. Avoid all artificiality and make your construction work blend with the landscape. There are three principal divisions of game management: the improvement of food, cover and nesting areas.

One of the first steps is to find out the amount of game

on the land and if the foundation is not there the area should be stocked. If there is already game upon the area it is indicative that with improvement the area can support an increase. You are probably all familiar with heavy concentration of game and the accompanying concentration of predators, the breaking out of disease, the heavy hunting and all of the attendant ills. The area to be properly managed should be sparingly stocked and the game supply should be permitted to increase naturally to its full carrying capacity.

It is often helpful to draw a plat of the farm or area noting thereupon its natural advantages such as listed above. From such a plat any of you could estimate very closely the game carrying capacity of that area and can tell whether or not the area is overbalanced as to food or cover. From this plat also you could spot your food and cover plantings, the fence rows which should be allowed to grow up, the outside rows of crops which should be left for winter feeding and plan the lines of continuous cover so that the game would never have to be exposed in getting food and water.

An over population of game is as bad as under population. No one can tell specifically what should be done to land in general. Each area must be studied and recommendations made to fit the particular area. You have available in your library long lists of plants, shrubs and trees which produce food for game. There are also many plants and shrubs which afford cover. Each one of these plants and shrubs require certain soils to attain their maximum growth which, of course, necessitates a soil survey of the area to be managed.

To restore this area in a small degree to the former game carrying capacity should be our job. We can not restore primitive conditions but we can reconcile game management to the present agricultural practices to such an extent that our state can furnish good hunting to our normal supply of license buyers. Our state is too intensively cultivated to support a large army of non-resident hunters and we will never try to follow that policy.

You will be given at this school additional courses in game management which will go into much greater detail and enable you to advise the landowners in your territory upon this question.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
WARDENS TRAINING SCHOOL

GAME BIRDS OF INDIANA

Many of the activities of the Department of Conservation, particularly the Division of Fish and Game, have a definite relation to the birds of Indiana. The major relationship is to the birds of the game species--quail, pheasant, partridge, prairie chicken, ruffed grouse, wild turkey and the ducks, geese, brant and others of the migratory species.

This is the side of the department's work which is most generally known and understood for birds of these species are protected by special laws enforced by the game wardens and may be hunted only at times and under conditions prescribed by statute or regulations of the department.

A second phase is the encouragement of control measures directed at the predatory species--the crow, sharp-shinned hawk, Cooper's hawk and the great horned owl--which are seriously affecting both the game and song birds. This phase has become known in recent years through the medium of the crow control contests sponsored by the department among the conservation clubs. No active campaign against other forms of air-predators has been sponsored although an individual warfare has been waged against these species by bird-lovers and conservationists.

Few residents of Indiana realize the work of the Department of Conservation in the protection of song birds and others of the desirable species. While the laws designed to protect birds of the song species are under the jurisdiction of peace officers and are not a part of the statutes generally regarded as conservation measures, the department is the only agency of state government interested in their welfare.

Every activity of the department for the creation of better game bird conditions in Indiana, has a resulting benefit to the song and other birds of the desirable species. The planting of grain and other vegetation producing seed or fruit for quail and pheasant food, increases the potential food supply for all species--the song birds as well as the game birds. The establishment of shelters for the protection of game birds during months of severe winter weather, provides protection for the song birds. The extensive winter feeding program which the department has undertaken with the cooperation of the local clubs, provides food for the song as well as the game birds.

During the time that the game food plantings, building of shelters, winter feeding and predator control have been sponsored by the department on a constantly increasing scale, there has been ample evidence that these measures have benefitted both game and song birds.

Occasionally there has been some remark critical of the department or its operations, referring to the steps being taken to increase the number of game birds or encouragement of predator control. These are usually the result of ignorance of the broad field covered by the department in its relationship to birds.

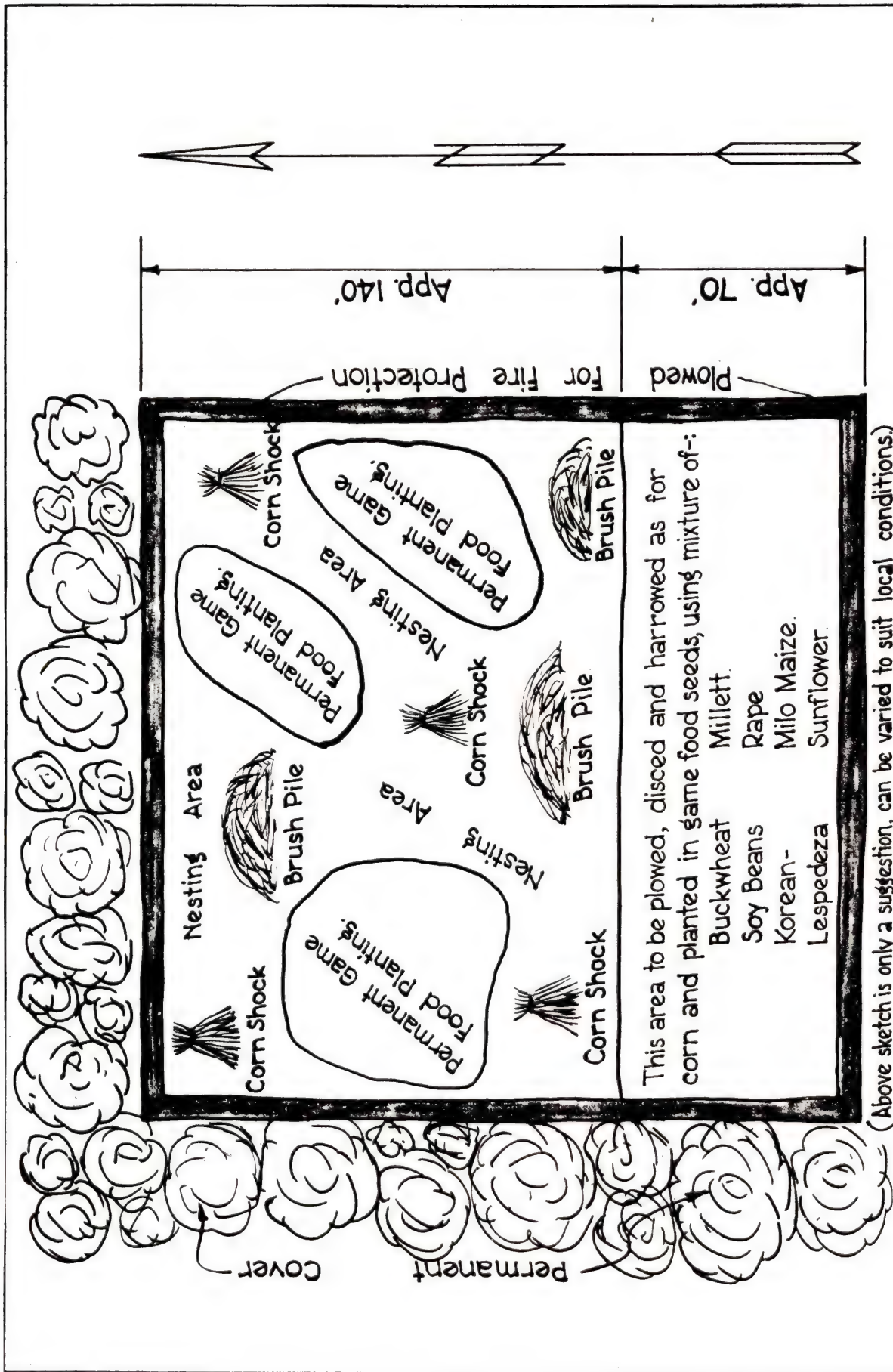
Each warden should see that no such misunderstanding exists in the minds of the persons he contacts, pointing out what the department's operations mean to the song birds in providing food, cover, protection and freedom from predators. An additional fact to be emphasized in such cases is that most of these activities are carried out or directed by the wardens, who are paid by the sportsmen through the purchase of hunting licenses. Without this direct support by the hunters, there would be no active agency directly concerned with the welfare of the desirable birds.

The following is given in concise form, showing interesting data on Indiana's game birds.

GAME FOOD SEEDING TABLE.

Species.	Time of Planting.	Rate of Sowing. *	Seasonal Availability as Game Food											
			Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1. Buckwheat.	July 1, - July 15.	1 bu. - acre.												
2. Cow Peas.	May or June.	2 " "												
3. Millet.	June.	20-30 lb. "												
4. Sorghum.	May - June.	10 lb. "												
5. Soy Beans.	May 15, June 15.	2 bu. "												
6. Korean Clover.	Mar. - Apr. 15.	6-12 lb. "												
7. Rye.	Oct. - Nov. 1.	6-pks. "												
8. Corn	May 1, - June 1.	1½-gal. "												
9. Kaffir Corn.	May - June.	1- pk. "												
10. Sun Flower.	May - June.	10-lb. "												
11. Sudan Grass.	May 15 - May 31.	30-lb. "												
12. Vetch.	Aug. 1 - Nov. 1.	25-lb. "												
13. Crimson Clover.	Aug.	15-lb. "												
14. Common Lespedeza.	Feb. 15 - Apr. 1.	6-12-lb. "												
15. Chinese Soy Bean.	May 15, - June 15.	¾-bu. "												
16. Rape	May 15, - July 15.	4-lb. "												

* Above schedule provides for broadcasting only. Most quantities can be reduced if planted in rows.



(Above sketch is only a suggestion, can be varied to suit local conditions.)
**ONE ACRE (Approx. 210 ft. Square) GAME
 FOOD AND COVER IMPROVEMENT PLANTING.**

Department of Conservation
 406 State Library Bldg.
 Indianapolis, Indiana.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

WILDLIFE FOOD PLANTINGS.

Necessity for participation in a state-wide program for planting grain, trees and shrubs which produce natural food and shelter for wildlife is becoming one of the most important phases of Indiana's campaign to restore and maintain an adequate stock of beneficial wildlife.

The importance of an ample, natural supply of food-producing trees and shrubs has been stressed with increasing emphasis in recent years as essential to a constructive wildlife program. During this period it has gained increasing support and cooperation among farmers as well as sportsmen.

Realization of the key position which an adequate wildlife food supply occupies in any attempt to increase Indiana's stock of game birds and animals, results from the stimulation of conservation activities traceable to formulation of a definite conservation program and union of all interested groups into a single organization seeking accomplishment of that program.

Third Important Development in Game Management.

This campaign to increase the natural food supply and shelter for wildlife, is the third and most important development of a program inaugurated a half-century ago by conservationists seeking to maintain the then dwindling stock of wildlife. The first phase of the program was enactment of legislation establishing closed seasons and fixing bag limits to prevent wholesale taking of birds and game by the hunter.

First and Second Steps Taken to Increase Wildlife.

Although these laws had some beneficial effects, those interested in preservation of wildlife and continuance of hunting, soon realized that the steps which had been taken were insufficient. They realized that the rapid, continued development of Indiana, as an agricultural and industrial state, was crowding out wildlife. This led to the second phase of the program--the establishment of a state game farm where game birds could be propagated and released to replenish the fields and woodlands.

This activity has been expanded in an effort to meet the demands of a constantly growing number of hunters and the serious inroads which were made in the stock of birds and animals by lack of proper natural food or shelter in all parts of the state.

Winter Feeding Only an Emergency Measure.

An attempt has been made to prevent the loss of birds and other wildlife during the winter seasons when the natural food supply was exhausted or cut off by snow and ice, through emergency feeding. This has been very successful and has had the support of many thousand men and women, many of whom had not previously engaged in any conservation activity.

But winter feeding of wildlife is and will continue to be merely an emergency movement. It is but a step in the program that seeks establishment of sufficient natural food sources and should be necessary only in periods of unusual weather conditions. There should be no occasion for winter feeding in any part of Indiana at any time unless the ground is covered with snow or ice.

Wildlife Food Plantings -2-

Today, however, emergency feeding is required in many parts of Indiana through the winter and early spring months although there is no snow or ice. Lack of sufficient natural food sources and the exhaustion of such food as does exist before the spring growth has started, creates an emergency that must and is being met by the feeding program.

Suggestions for Improvement well Received.

The Department has constantly urged and sponsored the planting of grain and other food-producing plants as a means of providing sufficient food for wildlife. These suggestions have had a fine reception and many acres of spot-plantings have been made by the conservation clubs and by individual landowners. Bushels of persimmon seed and smaller quantities of other food-producing tree seed have been distributed to landowners for planting. Many clubs have gone a step further and have acquired or leased land on which they have planted grain which was left unharvested to supply food for wildlife. Movements for the retirement of sub-marginal land from active agricultural production, have made and will continue to make possible an extension of game food plantings.

Investigation of Requirements Being Made.

The Department has begun and is continuing a study of data in preparation for the formulation of a definite, state-wide game food planting program. There are many widely separated, seemingly unrelated facts which must be studied and coordinated before such a program can be adopted. Indiana has a variance in climate, in soil composition, in water levels and in wildlife population which must be taken into account. At the same time consideration must be given the present food supply available for wildlife before recommendations can be made as to deficiencies and the types of planting to be made.

Work on the development of this program is proceeding steadily and if you have not already been asked for information concerning your district, such a request will be made. You can prepare yourself for valuable assistance in the formulation and operation of this program by studying the natural food sources for wildlife in your territory, by acquainting landowners and sportsmen with the purposes and advantages of such a program and by assuring them of the department's eagerness to cooperate in the establishment of such wildlife food plantings.

Supply of Wildlife Depends on Food and Cover.

It is axiomatic among informed conservationists that a designated area will support only the wildlife that can subsist upon the food available in that area. For example: if a sixty-acre farm now has two coveys of quail, you will not find four coveys there next year unless the food supply on that farm has been increased sufficiently to support the additional birds. In this nature has endowed the wildlife with a characteristic that the human race frequently lacks. On the other hand, the number of quail on a designated area can be increased through the adoption of game management methods. These are simply the provision of ample food sources, shelter and protection from natural predators.

Large Expenditure Unnecessary.

Practice of game management does not involve the landowner in any financial outlay nor does it interfere with his normal use of the land for agricultural purposes. Every farm, with rare exceptions has one or more small tracts which are not cultivated. This may be due to drainage, contour, or other conditions which make it unprofitable. Such areas as these are easily adapted to use for spot plantings and as refuges for wildlife.

For your information in urging use of uncultivated and waste land for wildlife food plantings, two charts have been prepared: one showing methods of planting a one-acre tract, and the second listing various grains which make valuable wildlife food sources. The chart listing the grains has been worked out in detail, showing the time of planting, the quantity to be sown per acre and the seasons in which it is available as game food.

In your contacts with landowners and conservationists, you will find most of them willing to participate in this program but hesitating because they are not sure just what to do or how to do it. It is to meet this condition that the two charts have been prepared for your information and it is essential that you become thoroughly familiar with the data which they contain. Copies of these charts are being prepared for distribution to interested landowners and to clubs which desire to participate in this conservation activity.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

PINNATED GROUSE

Range

The pinnated grouse is generally known as prairie chicken and once inhabited the plains and prairies between the Alleghany and Rocky Mountains. Their present domain is confined to middlewestern and central-northern states and some parts of Canada.

Prairie chickens once were plentiful in the prairie counties of Indiana but apparently, the increasing civilization has gradually pushed them out until now they are confined to four or five counties located northwest.

The Department of Conservation has had the opportunity to study a flock of these grouse on the Jasper-Pulaski State Game Preserve for the past several years. Food and cover along with protection were provided but a steady decrease in annual counts from approximately fifty-five birds to twenty birds resulted, with the count remaining about the same for the past two years. The steady development of this game preserve with a CCC camp started in 1933 possibly has had some bearing on this stock.

It is hoped that a closed season in Indiana on prairie chicken, which is effective in 1937, will help these birds survive what apparently might be their last stand in this State.

Habits and Breeding

Prairie chickens are usually found in prairie fields, where hay or tall swamp grasses grow or in adjacent grain fields and not around or in heavy brush or woods, although they will take cover in such places if forced, as well as, in winter for protection and feeding. They are found in groups ranging from a few birds at mating time upward to hundreds in fall or winter. They are strong and fast fliers, flushing upward for fifteen or twenty feet and then level off for a long flight, produced by short rapid wing beats alternating with sailing.

Breeding season, during March and April, is a most interesting sight as male birds, possibly a dozen or more, will congregate on a knoll in early morning and start a dancing and booming performance to attract females. Each male on his own little spot will strut and dance, rapidly stamping the ground with his foot, and with feathers all puffed out and tail spread he will let out a deep-toned three-syllabled boom-boom-boom from his large air sacks located on each side of his neck. Then follows more prancing, some cackles and advances as if to fight but apparently there are few feathers pulled out on these

Pinnated Grouse - 2

strutting areas. The booming carries for two to three miles on still mornings and will attract females within range. Breeding takes place on or near these courting spots.

Female birds produce from nine to fifteen eggs in very well concealed nests and eggs require approximately twenty-three days for incubation.

Artificial propagation has never been successful.

Foods

Pinnated grouse feed on insects, green foods, weed seed, grains and buds. This family of game birds thrive on tree buds and are often able to survive through heavy snow seasons by existing on such buds.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

HUNGARIAN PARTRIDGE

Range

This game bird has been imported from Europe by the thousands for many years with efforts by many states in making large plantings to get it established, but in most cases complete failure resulted. Results could probably be classified by showing only four sections where the Hungarian has become established out of extensive plantings in almost every state in the Union. One is in northern Montana and extends into Canada and this one probably has the greatest population. Another is on the line between Minnesota and Iowa with another in a similar position between Wisconsin and Illinois and the last includes a section covering northwestern Ohio, northeastern and central Indiana and southeastern Michigan.

In Indiana, during 1907, 1908, 1909 and 1910, about 12,000 partridges were imported and released in every county of this state. No other releases of any importance have been made since. Some scattered counties have a few birds left but they are really established in a half dozen northeastern and central east counties.

Habits

The Hungarian in Indiana is found in intensive farming territory and seemingly does not require the cover that other game birds do. They range practically the year around in agricultural fields, changing fields only when farming activities force it. Corn and stubble fields seem to be their favorite and often a covey of birds will range only an eighth to a quarter of a mile unless some unnatural cause compels a greater range. Flocks of ten to thirty are found together. Partridge are good runners and will often cover several hundred yards in front of dogs before flushing. They rise with much speed and noise, accompanied with a startled cackle. Rapid wing beats alternating with glides provide a speedy retreat with them flying usually only a few feet above the ground.

A distinctive characteristic of Huns is the constant flittering of their tails in a very short up and down quick movement.

Breeding Data

Hungarians are not like other upland birds insofar as mating is concerned, excepting in the wild where it is quite

similar to that of the quail. It is very evident that the female picks her mate each spring, at which time there is much fighting between male birds as they make attempts to attract a female, yet she seems to be the deciding factor as to her mate. Mating periods are earlier than those of most other game birds, getting under way as early as January, but actual breeding seldom starts before March, with nesting in April or later. As these birds inhabit a farming belt in Indiana and their nesting season occurs at a time when much field work is going on they pick nesting sites along fence rows or light cover, preferably in blue grass, near the area of their range. A nest is constructed by digging out a shallow hole, lined first with coarse materials and then with fine grasses. The number of eggs averages between twelve and twenty. One nest has been found in Indiana with twenty-two eggs in it and it was known that all of these were produced by one hen. The female does all of the incubating with the male bird always on guard duty nearby, but after hatching, which requires about 23½ days, he assumes a greater parental duty. Young birds develop rapidly as most game birds do and remain with their parents, forming a covey, until the next mating season.

Sex coloring and marking are very similar and can best be distinguished by the straight white lines running vertically down the center of wing covert feathers in the male while these lines are barred irregularly in the female.

Foods

Hungarians, young and old, feed on many insects during summer and fall. Seeds of weeds are another important food. Grains, berries and vegetable matter are used and water is secured chiefly from dews, insects and vegetable matter.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
WARDENS TRAINING SCHOOL

THE BOBWHITE QUAIL

RANGE

The bobwhite quail is without question the most popular of all game birds throughout the central states, southern states and some eastern states, and especially in Indiana. It belongs to the partridge family and in this country it is found in three subspecies, with these varying slightly in color and size. These subspecies are known as the eastern bobwhite, which is native to Indiana; the Florida bobwhite and the Texas bobwhite.

Indiana has an abundance of quail in every county, with certain sections showing heavier populations than others. Most of the central and northern counties are well stocked excepting those heavily farmed areas depleted of cover. Southern counties almost as a whole support the greater numbers of Indiana quail. This territory is rolling, open and wooded with scattered farming, but has a heavy growth of weeds and ground cover furnishing an abundance of feed and protection. It is natural quail supporting land.

HABITS

Quail are generally designated by a sportsman as a covey, taken from the fact that these birds, even as early as four weeks of age, will covey together on the ground at roosting time in the evening by forming a compact circle with all tails to the center and heads out. This formation furnishes both warmth and protection and when flushed they rise rapidly in all directions from this circle. Quail often covey during daylight hours also, when weather conditions are bad and warmth is needed. During the day when quail are flushed they fly rapidly in one direction by short rapid wingbeats and then sail with down curved set wings. Their flights are normally only a few hundred feet unless they are disturbed a second or third time when longer flights are made. They range only from a quarter to a half-mile according to food and weather conditions and usually stay close to heavy woods cover, feeding out from this cover into open fields. Protection from hunters, dogs or predators most often is sought in heavy cover where coveys scatter widely but when danger is past they hastily get together again by calling with what is generally known as the "scatter" or "covey" call.

BREEDING AND REARING DATA

Often in February, there are first signs of mating of quail in Indiana, with this continuing through March and early April when coveys break up into mated pairs with each pair going its own way to remain together at least throughout the nesting and rearing seasons, and probably until the following spring. Nests

are constructed and well concealed often in both growing and dead cover with the male bird doing the work. Egg production starts often in April and May extending to as late as September. The female lays from twelve to twenty eggs in as many days in her nest and starts incubation which covers a period of about 23 days. The cock bird shares this duty with his mate and relieves her often on the nest and either parent might be on the nest at hatching time but in most cases observed, it is the hen. Young quail are brooded often by either parent until they are two or three weeks old, particularly in cooler temperatures, and some authorities believe the male bird is the best parent. This is quite true in game farm operations or in making releases of newly hatched chicks when a cock bird in almost every case will readily adopt a brood of young while the female cannot be depended upon to do this. New broods of quail are not fed by the parents, at least not consistently, as some of our insectivorous birds, but are made to rustle for themselves. Moisture or drinking water is secured from morning dews that are deposited on plant life and also from insects. This supply is sufficient throughout any normal year, but an occasional summer drought, such as occurred in 1936 when both morning dews and insects were lacking, proves detrimental to chicks of the rearing age as well as to eggs in process of incubation.

Young and parents normally remain together until the following spring unless the covey is broken up in an unnatural manner. One brood of young is normally all that a pair will produce in a season, but it is believed that on some occasions two broods are raised. This is based on observation of one covey containing two sizes in young birds along with the pair of parents.

FOODS

Foods relished by quail consist chiefly of insects, weed seeds, grains, buds, berries and mast, and Indiana is favored with a general distribution of one weed, the ragweed, which furnishes an abundance of quail feed. Food conditions probably have some bearing on weights of quail, but an average weight would be near $6\frac{1}{2}$ ounces.

ECONOMIC VALUE

Besides furnishing a great amount of sport, shooting and food for sportsmen, the quail destroys many insects and is well loved by Indiana wheat farmers for its destruction by eating of the Hessian fly.

It appears that no one can offer any just complaints against this noble game bird.

STATE OF INDIANA .
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

RUFFED GROUSE

Range

In states where the ruffed grouse are plentiful, they are considered as the greatest upland game bird. Their range covers northeastern and central northern states and southern Canada. In Indiana this bird was plentiful at one time but they have been driven north by civilization. They are still found in the southern part of the state but in no great numbers.

Habits and Food

An interesting characteristic is the drumming of a male grouse which sounds quite similar to a distant rumble of thunder. It is produced by a rapid beating of the air with the wings, starting with a slow and measured motion and rapidly increasing. It ranges almost entirely in woodlands. Life cycles are very evident in ruffed grouse, thought to be caused by disease or possibly food conditions. The number of birds ranges from high to low over a few years period during a cycle returning to a high as the life cycle goes up or to a low as it goes down.

Food consists of insects, chiefly grasshoppers and crickets and buds of shrubs and trees.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

WILD TURKEY

Range

The Wild Turkey is considered by many in Indiana as the grand old native game bird of this state but his existence here has been missing for many years. Their present range is in south-western and southern states and a few eastern states.

Habits

They roost entirely in large tall trees in groups of ten to fifteen, affording protection, except against the hunter and if he is lucky enough to locate a roost, easy targets can be had.

Breeding Data

Breeding season starts in February and continues through March and April with nest being made on the ground probably concealed against a tree or under a bush. Ten to fourteen eggs fill a normal nest with the female doing all of the incubating and brooding. In fact, a male bird after mating does not associate with a female and her brood.

Artificial propagation is not difficult to get good results with wild turkeys but much difficulty arises in holding the wild instinct in such pen reared birds. Planting of "wild turkeys" have been made in recent years in southern Indiana but this stock usually makes their appearance at the nearest farm home in a short period after liberation.

Food

Foods consists chiefly of insects, mostly grasshoppers, for which they will range wide to find, also seeds, berries, grains and mast.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

CHUKAR PARTRIDGE

The chukar partridge is a native of India but is found in many parts of Asia at various altitudes and has the reputation of being a most hardy bird, able to withstand severe winters and hot dry summers and adaptable to most areas, although shows an inclination toward a broken wooded country. They are not found in wet areas.

The chukar is a beautiful bird with a mixture of light and dark gray with red, black striped on each side and a black stripe running through and back of the eyes and on around the throat. They are considered a very sporty bird in that they will hold for a dog, flush with great speed and use a weaving style of flight. They are almost three times as heavy as bobwhite quail.

This partridge has not been introduced into this country but a short time, but has been received enthusiastically. It's adaptability as a game bird has not been determined but it is looked upon favorably as an important addition.

Indiana experimented with chukars on a small scale at the Jasper-Pulaski State Game Preserve in 1936. Fertility of eggs produced from two pairs was very high and incubation in electric incubators was good. Brooding of chicks was conducted in electric quail brooders and results obtained were good, being on about the same basis as quail. In growing and holding pens, young chukars readily accepted these pens as home, although they are somewhat nervous and always on the move. Mortality during the brooding, growing and holding periods to date have been low.

Sufficient breeders for a large reproduction in 1937 are in pens on the state game farms and until extensive stocking tests can be made, the status of the chukar partridge in Indiana is unknown.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

PHEASANTS

Range

Something over a hundred species and subspecies of pheasants are known, all being native to Asia and the East Indies, but since their introduction and establishment in the United States, their abundance and popularity has classed them by many as native game birds. This becomes more impressive when one considers that our domestic chickens are descendants of the pheasant.

Indiana's first release of pheasants was made in 1899 when the Commissioner of Fisheries and Game liberated 250, and it might be interesting to know that Indiana's first closed season on pheasants was enacted in 1899, covering a five year period. In 1903, the Commissioner established a pheasant hatchery in Madison, but poor results caused it to be abandoned in 1905. Not much was accomplished with pheasants until interest was revived in 1927 when pheasant eggs were purchased and distributed. This continued through 1928 and 1929. In 1930, pheasants and eggs both were produced and distributed from the Brown County Game Preserve and continued from that place in 1931, 1932 and 1933. In 1931 production of pheasants and eggs was started on the Jasper-Pulaski State Game Preserve and since then production has continued and greatly increased with this being supplemented by production from the Wells County State Game Preserve, which was started in 1933. Ringneck pheasants are the principal species propagated.

Pheasants have become well established in all northern states entirely across the country and in some parts of southern Canada since their introduction.

In Indiana, where stocking has been intensively made in every county for the past six years, pheasants have established themselves only in the northern half of the state with a few local exceptions. It is very apparent that even in this north half pheasants are not holding their own in clean farming areas where cover is lacking. This area includes centrally located counties. Populations increase farther north where many more kills were made during the past open season than in any other section. Northwest, northeast and central eastern counties also showed up well. Pheasants like open farming country where there is also heavy cover but they are not a woods bird. The pheasant populated areas as shown above coincide to these conditions while other sections of Indiana do not. The Department of Conservation, guided by distributions, census reports and results of the first open season of 1936 have adopted the policy of restocking those areas on which the pheasant prospers.

Habits

Pheasants have a roving nature unless they are satisfied in their surroundings and will often move several miles in search of suitable conditions affording food and cover but once this is found, their range is usually limited to a few acres. They become very accustomed to human beings, automobiles, etc., often appearing on road sides and near farm buildings, and even enter farmers' chicken lots at times where fights usually occur between domestic roosters and pheasant cocks. Sometimes the roosters are killed and on some occasions the Department has had to trap or catch up cock pheasants on such complaints from farmers and move the birds to other areas. This is all quite true of the cock pheasant and because of his boldness and brilliant coloring he is more readily seen and identified. The hen pheasant is more cautious taking advantage of her coloring and marking to hide when danger approaches and she is so successful in concealment that it often requires a diligent search by one to locate her. This fact accounts to some extent for reports received from different places that cock birds are present, but hens are not. Investigation of many such reports has shown hen birds were present but were not being observed.

An entirely different situation arises when a hunting season opens as pheasants readily recognize their danger and retreat to heavy cover where their chances are much better to hide or shift about in front of dogs or hunters. All pheasant hunters will relate the difficulty in locating birds after the opening date of a season or even after noon on the first day.

Pheasants are fast and long runners when pursued by dogs and will sometimes go across several fields before being pushed to a flush, when a cock bird often cackles as he leaves the ground. The hen never does this. Both sexes are fast fliers and generally make long flights, upward to a half mile, when flushed.

They generally roost on the ground singly, sometimes, but not often, on low branches, and travel and feed either alone or in groups.

The pheasant has been criticized at times for fighting and even driving out other game birds, particularly quail. This evidently must be founded on false rumors, because all dependable authorities deny it. It has been disproven on Indiana game farms in several instances. It is true that the cock pheasant is a fighter, especially so during breeding season, but other game birds, even the quail, and game animals are also.

Breeding and Rearing Data

Pheasant mating season gets under way in February and continues into July in Indiana. They are polygamous and one

cock bird might have five or six hens in his harem. At nesting time in May and June, the cock pheasant becomes king of the territory occupied by his mates, at least one would get that impression in watching his movements at this time. His pose with head high, his slow strut while walking and his challenging crow, coupled with a very rapid wing beating, all are interesting and impressive. The hen pheasant builds her own nest in which she lays from nine to sixteen eggs, does all of the incubating over a period of about twenty-four days and takes full charge of her brood. The male will often join one or another of the broods hatched from his harem, assuming more or less of a proud father attitude, but not any of the brooding duties.

Pheasant chicks grow rapidly, feeding on insects and tender vegetable matter, rustling this food themselves under the guidance of their mother. Water is secured from early morning dews and rains. At ten days old, young birds can fly for short distances and at three weeks to four weeks they can make sustained flights. Young birds have identical coloring until at about six weeks some coloring starts to appear in the male, but it is not until late summer before he gets normal plumage. A brood of pheasants often breaks up even at the age of seven or eight weeks, scattering either in singles or groups.

Only one brood is produced during a season unless an early hatch or clutch of eggs is destroyed when a hen pheasant will sometimes produce her second hatch.

Foods

Foods used by pheasants consist chiefly of insects, weed seeds, grains, buds, berries and mast. They are also fond of garden vegetables which at times produces some complaints. Cutworms are relished by them and this fact has brought complaints from farmers that pheasants were digging up and eating their new young corn, giving proof that the pheasants were actually seen at this destruction. The truth is that the birds were after a favorite cutworm, which would have killed or possibly had already cut off the young stock of corn. At the same time, a pheasant might rob some planted grain, but not any more than other game birds.

Economic Value

It is a known fact that a large part of pheasants' summer diet consists on insects, many of which are injurious to farmers' crops. This coupled with the fact that these birds are rapidly making a large part of upland game bird shooting should far more than offset any damage they do.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

JASPER-PULASKI STATE GAME PRESERVE

Approximately 5200 acres are in this property, located in Jasper and Pulaski counties on State road No. 43, about 50 miles north of LaFayette.

It was acquired by purchase in 1930 and has been developed as a game refuge and propagation plant producing quail, pheasants, partridge, waterfowl, raccoon and rabbits, the latter species being on an experimental basis.

Equipment installed here consists of an incubator house, using two electric incubators and hatchers with a total egg capacity of 24,000 pheasant eggs and 36,000 quail eggs. An egg room is a part of the incubator house. Also 36 quail and partridge electric brooder houses with a season capacity of 14,400 birds; 43 pheasant electric brooder houses capable of handling almost 20,000 pheasants; 12 raccoon houses totalling 240 pens and a 45 acre rabbit experimental field. A three-quarter acre covered field with 108 breeding pens was constructed specially for Hungarian partridge. Special pens have been made for chukar partridges and 2050 - 3'x8' breeding, growing and holding pens have been and are being constructed for quail and partridge. Approximately 35 acres are used for these pens. Eight pheasant breeding pens are used for 2000 breeders and over 16 acres are in covered pens for holding approximately 11,000 pheasants.

Twenty-three miles of boundary fence follow the perimeter of this preserve. A complete road system is constructed within the property. Fire-lanes, 30' wide, surround every 40 acres, excepting marsh areas.

This land was once a part of the Kankakee marsh and in recent years about 1,400 acres have been restored, furnishing breeding, feeding and resting areas for waterfowl. Thousands of ducks and other water birds use this marsh.

Picnic grounds, two shelter houses, public toilets and outdoor ovens are available. A fire tower and wildlife displays are other attractions for the public.

Other constructions not mentioned include six residences for employees, a service building, feed barns, a machinery shed, pump house, storage sheds and a vegetable storage cellar.

About 8 men are employed steadily with twice that amount being used during game rearing seasons.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

WELLS COUNTY STATE GAME PRESERVE

In 1935, approximately 1000 acres of land in a block were purchased along the Wabash River about 4 miles east of Bluffton and this property is known as the Wells County State Game Preserve and State Forest.

This property has a three fold purpose, being developed as a recreational center, a nursery for producing young trees and shrubs, and a propagating plant for game.

Recreational equipment completed and under construction includes shelter houses with public toilets, picnic areas with outdoor ovens, childrens' playgrounds and wildlife displays.

In the nursery, many varieties of young trees and shrubs are already in production.

The game propagation on this game preserve includes quail, pheasants and raccoon, with experiments in the production of cotton-tail rabbits being conducted. Quail, pheasants and some raccoon were produced in 1936, with all equipment being increased for the 1937 season to include a total of 30 quail electric brooder houses with a total capacity of 12,000 birds; 18 pheasant electric brooder houses with a season capacity of 3,000 birds; 20 raccoon houses totalling 400 pens and 41 rabbit experimental pens. A specially designed incubator house, with egg room, also has been constructed housing two electric incubators and hatchers with a total capacity of 24,000 pheasant eggs or 36,000 quail eggs. Other equipment includes a ten-acre quail field with 1000 breeding and holding pens, 9 pheasant breeding pens with a capacity of 2250 breeders and approximately 12 acres in pheasant covered pens that will hold 8000 birds.

A complete wildlife display of birds and animals is in operation, also a fish and waterfowl lake is under construction.

Other structures not mentioned are a custodian's residence, a service building, ice and refrigerating house, nursery building and feed barn.

About 7 men are employed regularly, with extra help being used in spring and summer game rearing seasons.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

INDIANA STATE GAME PRESERVES

Brown County State Game Preserve

This property of 12,000 acres is owned and operated by the Division of Fish & Game. It is located in Brown County about 4 miles south and east of Nashville and joins the Brown County State Park, operated by the Division of Lands and Waters.

The Brown County State Game Preserve was acquired by purchase in 1924 and 1925, and in addition to being used as a game and wildlife refuge, Indiana's first major step in artificial propagation was started in 1930 with pheasants and continued for three more years when these operations were abandoned, with all equipment being salvaged and transferred to the Jasper-Pulaski State Game Preserve. It was found that soil and terrain conditions on the Brown County property were not adapted for the propagating efforts established. These efforts were not a failure as many pheasants and pheasant eggs were distributed, but they were unsatisfactory, which caused the discontinuance of this work.

Through game management, stocks of game, principally quail and rabbits, have been increased with natural propagation resulting in large numbers of these species being annually trapped and moved to other parts of the state for re-stocking.

During both spring and fall game distributing periods, the facilities of this property are used extensively as a game distribution center for the south half of the state, in conjunction with the northern propagating farms. This greatly expedites and simplifies the problem of rapid state-wide planting of the increased volume of game birds and animals being liberated in recent years.

Noted for splendor of scenery, this game preserve along with the state park attracts thousands of visitors each summer and fall. The preserve maintains a complete wildlife display which creates much interest.

The first archery hunting area was established on 1500 acres in 1936 on this preserve and the full acreage was opened to this manner of hunting in 1937.

Structures on this property consist of the following: custodian's residence, service building, wildlife display building, 2 log cabins, 3 shelter houses, 1 hay barn and 1 lumber shed.

Other improvements are a complete sewage system, water reservoir with a distribution system, airport, roads, fire trails and two lakes. There are three regular employees.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

KANKAKEE STATE GAME PRESERVE

This property consists of 2300 acres located on state road No.8 in Starke and LaPorte counties. It was acquired by donation in 1924 and is used as a refuge for game birds, animals and wildlife.

Being a part of the old Kankakee River Marsh, it was drained in about 1900 as both the Kankakee and Yellow River ditches run through this property, yet during wet seasons much of this state land remains marshy, lacking, however, the supply of water sufficient to maintain levels during summer. At the present time, the Division of Fish & Game is developing a part of this land to create an all year marsh of several hundred acres, which will furnish nesting, resting and feeding areas for waterfowl besides other wildlife. It is believed that this marsh, along with other marshes and improvements being made in Indiana, will restore a part of the former large flight of waterfowl through Indiana and permit more and better hunting of this kind of game.

Structures on this property consist of one custodian's residence, one barn and one shelter house. There is one regular employee.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
GAME WARDENS' TRAINING SCHOOL

WATERFOWL IN INDIANA

The rapid decrease in waterfowl resources in the past six years has created a serious national and state problem and even extinction of some species has been threatened. Several reasons are advanced for this decrease, including a gradual elimination of marshes and water areas by drainage; a series of dry seasons throughout a great portion of the vast northwest waterfowl breeding grounds, causing these areas to dry up; a very heavy migration of crows to this same district during this period resulting in destruction of a countless number of wild duck eggs; and overshooting by many hunters. Such a critical situation has demanded constant attention to help remedy these conditions and the Federal government, as well as some states, has been striving by regulations and restrictions, by creating new waterfowl refuges and restoring others, to bring back waterfowl stocks.

Waterfowl are migratory and are regulated by a division of the United States Department of Agriculture, the Bureau of Biological Survey, subject to the migratory bird treaty act of 1918 made with Canada for proper regulations in both countries on waterfowl. Both the Biological Survey and the Canadian government have entered a general plan on creating and restoring waterfowl refuges and placing restrictions where needed.

Indiana's laws conform to federal regulations and are enforced accordingly.

The drainage of the Kankakee marsh, often called the Grand Old Marsh, some sixty years ago, brings to Indiana a true picture of what destruction of waterfowl refuges does. This marsh was known as the best in all of the central United States, with thousands of acres, supporting an unlimited amount of all kinds of game and fish, besides waterfowl. Drainage destroyed all of it and since, Indiana has been missed by the annual flights of waterfowl.

IMPROVEMENTS FOR WATERFOWL IN INDIANA

The Department of Conservation has not been reluctant in helping to restore waterfowl hunting to Indiana hunters. While suitable areas that can be used are extremely limited, a general improvement plan has been in progress for the past few years and results are already noticeable.

On the Jasper-Pulaski State Game Preserve, which is a part of the old Kankakee marsh, a small area of about ten acres was created in 1930 when this property was first acquired. Spring rains increased this water area considerably but drainage systems depleted it by early summer time. Aquatic foods would not survive. Ducks would stop in the spring and fall for a rest but would proceed on because conditions were not conducive to a

longer stay.

In 1933 a CCC camp moved in on this preserve but it was in the summer of 1935 before sufficient help could be taken from other needed improvements to start work on restoring a small part of the Grand Old Marsh on this property, and today, while it is still being developed, it stands out as a 1200 acre marsh, retaining water the year around, equipped with nesting areas and shelters, planted abundantly in waterfowl foods, and given attention on vermin control.

In early 1936 this marsh was developed over about 700 acres, of which 400 retained a supply of water through the dry summer of that year. Hundreds of young ducks were reared in this area during this first year of development besides many species of shore birds and other waterfowl.

NAME OF MARSH

Ringneck Lake has been designated as the name of this marsh, picked for the combination of ringnecked ducks that frequent the marsh and the ringneck pheasants that are produced on that game preserve.

DEVELOPMENT

This lake or marsh has been developed by connecting a series of oak ridges with levees on the down grade side of several hundred acres of watershed and by the construction of dams in drainage ditches on the property with great care being used in preventing any water or drainage damage to acreage adjoining the reserve. Within the marsh, numerous areas have been dug out to below normal low water level which in the marsh area is about three feet. This will furnish water through drought seasons. Banks that have been thrown up from these potholes have been and are being planted in food and cover. Numerous aquatic foods for waterfowl have developed from plantings. Supplementary foods such as grains are supplied in the area during spring and fall migrations.

Also, bird banding operations are carried on for the United States Biological Survey. Several hundred ducks of various species were trapped, banded and released in 1936.

SPECIES USING REFUGES

Following is a list of waterfowl species seen and noted in the Jasper-Pulaski waterfowl refuge:

Canada Geese
Snow Geese
Blue Geese
Mallard Duck
Black Duck
Pintail Duck
Wood Duck

SURFACE FEEDING DUCKS

Gadwall or gray duck
 Baldpate or Widgeon
 Blue-winged Teal
 Green-winged Teal
 Cinnamon Teal
 Shoveler or Spoonbill

SURFACE FEEDING DUCKS

Ringnecked Ducks
 Lesser Scaup Duck
 Redhead Duck
 Buffle-head Duck
 American Golden Eye
 American Coot or Mud-hen
 American or Black Scoter (coot)

DIVING DUCKS

Hooded Merganser
 Red-breasted merganser
 American Merganser

FISH DUCKS

Other Waterfowl & Shore Birds
 Sandhill crane
 Great blue heron
 Green heron
 American bittern
 Least bittern
 Sora
 King rail
 Virginia rail
 Plovers
 Killdeer
 Yellow-legs
 Sandpipers
 Woodcocks
 Wilson or jack-snipe

KANKAKEE GAME PRESERVE DEVELOPMENT

On this property, a similar restoration plan as on Jasper-Pulaski preserve is being developed and will comprise several hundred acres when completed.

The combination of year round open water on the Kankakee River and the Jasper-Pulaski marsh has already appealed to many species of ducks. During the past winter, the marsh froze over, forcing the ducks out and most of them retired to the open water of the Kankakee where feeding has been conducted within the Kankakee preserve. Thousands of ducks have wintered in this area during 1936-37, being the greatest number that has been noted in several years.

OTHER DEVELOPMENTS

Many made lakes have been and are still being constructed in the south half of Indiana on state owned properties, which, along

with a few natural lakes, have been and will be planted in waterfowl foods. These locations are providing additional feeding, nesting and resting refuges for waterfowl, coupled with the many northern Indiana lakes and the made marshes should produce a greater distribution of waterfowl over the entire state.

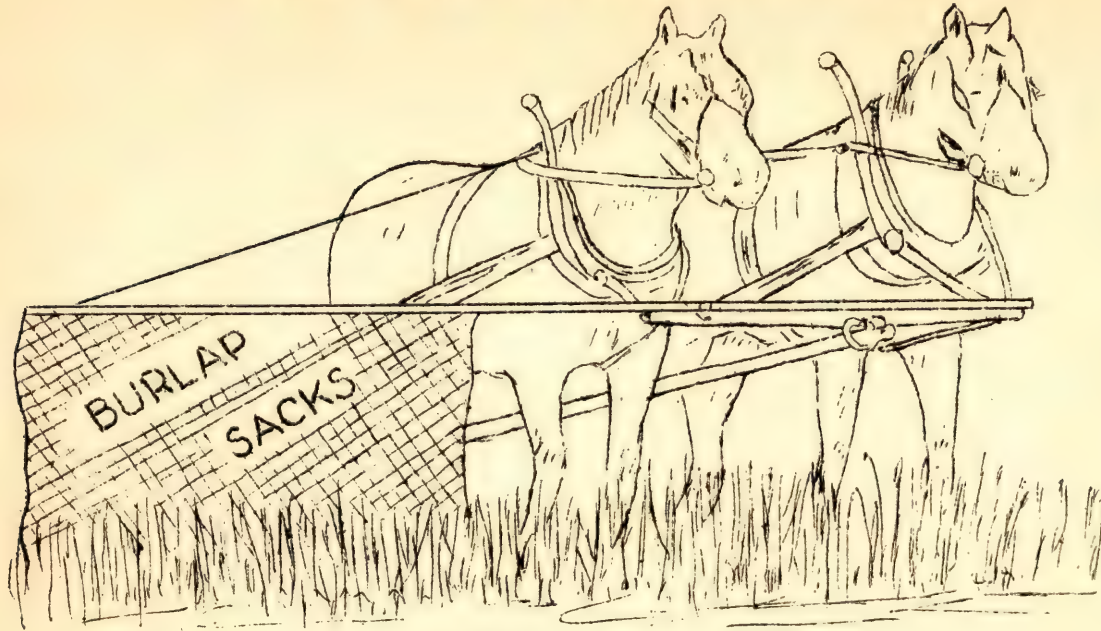
RESULTS

It is the desire of the Department of Conservation of Indiana in making these improvements to provide refuges for waterfowl, permitting resting, nesting, feeding and rearing, and to bring back through Indiana part of a former migration of waterfowl all of which leads to more and better hunting. And according to observers, these results are already beginning to show.

ARTIFICIAL PROPAGATION

The larger species of ducks such as the mallards or blacks are easily produced by artificial propagation but become so domesticated, including even the first generation from known wild parentage, that much difficulty is encountered in attempts to retain the natural wild instincts of these breeds. For this reason, artificial propagation is not entirely successful as a restocking project so is giving way to the creating of marshes and refuges developed to furnish natural breeding and propagation.

THE IOWA FLUSHING BAR.



Gradually we are learning that forces far more deadly than the hunter are at work against our valuable game birds. One of these has been the mowing machine. It is necessary to cut hay, but at the time such work is done, game birds are nesting, and they probably will have their nests---many of them---in the clover, alfalfa or other hay meadows. A means of using the mowing machine without destroying the nests of the quail, pheasants, and other ground-nesting birds has been found.

Mother birds lose much of their sense of fear. They often will sit on a clutch of eggs until the noisy mowing machine is upon them. When they flush and fly away, it is too late; the nest is destroyed, its surrounding protection is cut down and the hatch of birds is lost. Sometimes the mother birds are killed, though this happens rarely.

A flushing bar on a mowing machine will save the mother bird and the clutch of eggs and will insure a brood of young birds. Such a bar is cheap and it is easy to install. The best type is as follows:

Burlap Flusher: Made of a cane pole and burlap sacks. The pole extends out from the neckyoke. Burlap sacks are attached to the pole so they hang into the grass, being slightly weighted to hold them down. A strap attached to the outer end of pole, is attached to the hames. Cross links from old automobile chains make good weights for the sacks.

The man on the machine raises the sickle bar when the mother bird flushes, leaving a small patch of uncut hay about the nest; then lowers the bar and proceeds. This device will save thousands of valuable birds.

COUNTY _____

CLUB _____

THIS MEMORANDUM made and executed in duplicate this _____ day of _____ 193__ by and between the State of Indiana, Department of Conservation, Division of Fish and Game, hereinafter called the State and _____ hereinafter called the Organization.

WITNESSETH:

Whereas, the State desires to have produced and distributed a number of pheasants and quail in the areas of this State and

Whereas, the State desires to encourage the raising of pheasants and quail by clubs and organizations,

NOW THEREFORE IT IS AGREED, That the State shall pay the Organization for hatching, raising and distributing pheasants and quail on the following terms and conditions:

1. The State shall furnish without charge to the Organization pheasant or quail eggs to the number available for this purpose. The Organization shall furnish the labor, equipment, supplies and all other facilities necessary for the rearing and liberation of said pheasants or quail.
2. Price: The State shall pay at the rate of seventy-five (75) cents each for pheasants and quail when liberated at not less than ten weeks of age,
3. Conditions as to Production: The State shall approve all plans and arrangements for the propagation of pheasants and quail to be raised and distributed under the terms of this contract. The State shall not be liable to pay for any birds produced under any arrangements made by the Organization to which the State has not agreed.

4. Limit to the amount of birds to be purchased by the State from the said organization: The State shall not be required to pay to the Organization for birds produced under the terms of this agreement a total sum in excess of one hundred (100) dollars for birds produced and distributed at the prices and conditions herein contained.

5. Count and Distribution of Birds: When the birds mentioned in this contract are to be distributed, a representative of the Department of Conservation of the State of Indiana shall supervise the counting of said birds and the count shall be by number; and the Organization shall report to the State in writing the number of birds of contract age and the representative of the Department shall be present when the same are distributed by the Organization. On receipt of a voucher signed by the proper officers of the Organization that certain birds have been raised and distributed according to the terms of this contract, and said voucher having been signed and approved by the representative of the Department of Conservation designated to supervise the count and distribution, the Organization shall be paid the prices herein specified for the pheasants and quail raised and distributed.

In witness whereof the parties hereto have duly executed and signed this agreement the day and year first above written.

STATE OF INDIANA
Conservation Department
Fish and Game Division
Kenneth M. Kunkel, Director

By _____

Organization

Secretary

Contract Sent to Organization _____

Contract Received by State _____

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

PROPAGATION OF RACCOON.

System Used at Indiana State Game Farms.

Artificial propagation of raccoon was first started on the Jasper-Pulaski State Game Reserve in the spring of 1935 and extended to the Wells County State Game Reserve in 1936. The popular demand by the sportsmen of Indiana for more raccoon than the capacity of the equipment first installed on both game reserves caused the expansion of propagating facilities to a total of 520 pens, completed in time to use at the start of the 1937 breeding season.

At the start of the propagation work, raccoon breeders were difficult to obtain in the numbers required for the equipment constructed and the start was made with those that were available, consisting of a varied mixture of grays, blacks, yellows and reds, large and small, old and young, and to these were added a number of wild-trapped animals taken from state game lands. Since that time, a system of strict elimination of poor breeding stock, the retaining of large and good colored animals and the crossing of gray and black bloods has produced a stock of very high grade raccoon and as time permits further practices of these breeding methods, still better animals will be produced for stocking purposes in Indiana.

To the extent of capacities for raccoon, the Department's policy is to hold stock for liberation over each winter and make liberations about March the first, at which time a very high percent of the females would be bred.

Pens and Equipment.

Pens are constructed in groups of twenty, each unit being 80' long by 12' wide and divided so as to make twenty six foot by eight foot pens, with a height of approximately six feet, all covered with a roof. Ends, sides and partitions are all made with 16 gauge, 1 inch mesh wire netting which also extends about two feet below ground level. All pens have an outside gate and an inside small sliding gate connecting pens. Each pen is equipped with a nest box, constructed on 10" high legs with an 8" entrance hole in the bottom and a hinged door on top. A triangular shaped feed board and water-basin board are built into two corners of the pen about 1½' above the floor and a concrete water basin of a gallon capacity completes each pen's equipment. A gravel floor is used.

Mating Breeders.

One year old male raccoon are not dependable for breeding purposes and for this reason only two year old or older males are used. One year old females are dependable as breeders but these improve in this dependability as well as size of litters as they grow older.

Three females are mated with one male between January 1st and 15th and given the range of three pens. Older females usually breed during January and the younger during February. Males are removed to other pens a few days before the end of the gestation period of 63 days and each female is confined to a single pen. This is absolutely necessary to prevent fighting which, if it does occur, would in most cases cause the death of the young after they are born. This period when young are being born must be treated with utmost care as far as noise and disturbances are concerned in and around the pens because the nervous and cautious condition of a raccoon after her young arrive causes her to kill her entire litter if she is disturbed.

On Indiana game farms, a successful system of not opening a nest box after the young are first discovered for a period of six weeks is used with the pen being opened only once a day for feeding and cleaning purposes.

Litters range from one to seven in number and average approximately four young. Continued improvements in breeding stock should increase this average.

Young raccoon are grouped according to sex and color about September 1st, in groups of four to a pen, and are held in this manner until the beginning of the following breeding season.

Care.

General care consists chiefly of providing proper feed, plenty of fresh water, fine dry hay, grasses or leaves in nest boxes during winter and thorough cleaning of all pens daily. Several mixtures of feeds can be used and these consist principally of cereals with some form of meat added. At Indiana state farms, an abundance of predatory fish, seined from Indiana lakes, is fed during the summer months. Raw meat from undiseased horses and canner cattle is fed during breeding season and early rearing season. Sweet corn and green field corn are produced and fed during summer months. During early fall, pen raccoon add a surplus of fat for cold weather protection, the same as raccoon do in their natural environment, and often hibernate for several days through extreme cold weather.

Particular attention is given to cleanliness of all pens. Manure is removed daily. Pens are disinfected regularly and gravel is replaced in all pens annually. Sanitation helps to prevent disease.

Worms.

Pen raccoon are especially subject to intestinal worms and if these are not eliminated, infected animals will die. At Indiana state game farms, worms in raccoon are controlled by administering Nema Worm capsules, No. 187 size, semi-annually, at the rate of one capsule per raccoon.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

PROPAGATION OF COTTONTAIL RABBITS

In Indiana, the cottontail rabbit is widely and well distributed in every county and undoubtedly provides more sport, kills, and food than any other species of game. Their habitat in almost any field or wood where they feed at night on clovers, tender grass, grains, bark of some trees and almost any fruit or vegetable, then take up an all day idleness in hiding under a clump of grass, makes them a species of game that the youngest or oldest hunter can readily find. The speed with which a rabbit runs after being jumped from his daytime resting place, and the often zigzag course he takes, furnishes a thrill to a majority of hunters, comprising a much greater percentage of license buyers than any other group of sportsmen seeking game.

The archery hunters, who are increasing rapidly in numbers in Indiana, look upon the cottontail as their best bag, and many thrills and kills are often reported among those hunting with the bow and arrow.

Rabbits have been plentiful in all parts of Indiana for many years, but in more recent years stocks have been lowered in some areas, due probably to a combination of reasons. The severe winter of 1935-36, the extreme dry season of 1936, heavy and continuous rains during the early spring months at the time first litters are in their nests and floods all have played a part in the rabbit population in Indiana. Probably the greatest general depletion of stocks can be attributed to the automobile, as certainly thousands are killed annually on Indiana highways. The increase of these kills has been steady over the past few years with the improvements in roads and increases in the number of automobiles and their speeds. While rabbits are found dead on highways throughout the year, a greater number is seen during the spring breeding season when often two rabbits, being a male and female, are killed in an immediate area. The potential loss from such kills would probably mount into high figures.

PROPAGATION EXPERIMENTS

The need of rabbits for stocking purposes prompted the Department to start experimental work on propagation in 1934 at the Jasper-Pulaski State Game Preserve. An area of forty-five acres, about half open and half wooded, was enclosed with a ground vermin proof fence. The area provided both low and high ground and many brush covers were constructed with marsh hay added to these piles for both cover and nesting. Pole traps were spotted closely to help control air vermin. Food plantings were made to help reduce feeding costs. With everything in readiness, about 750 rabbits were trapped from State properties and released in the new experimental pen during the winter of 1934-35 with all rabbits being sexed to give a ratio of three females to one male. Approximately one hundred and fifty of

these rabbits died from various causes by March first and an undetermined number had been removed from the pen by air vermin. At about that time, young rabbits started to arrive and investigation showed one or two nests in every brush pile with many others being scattered in the field. Prospects looked good for a bumper crop and even more so in April when the young of the first litters began moving about. However, deaths in the parent stock continued, probably caused principally by overcrowding. Hawks and owls continued preying upon the field, caused by the heavy concentration of game and although many hawks were killed in the field, and others along with owls were trapped, it appeared that a new hawk or owl was attracted in for every one taken out and this became especially noticeable in March and April with the northern migration of birds of prey and the appearance of young rabbits, which made very easy kills for an alert hawk or owl. Trapping operations were started to help relieve this situation with only young rabbits being trapped and this operation continued throughout the rearing season being extended to include the parent stock. The final number taken from the field approximated the original amount of the parent stock, being 750. This same figure would not be a high estimate of the rabbits killed by air vermin.

It was learned in this experiment that:

1. The number of rabbits used as parent stock was too great for the size of the field.
2. With an area of that size, little or no control of diseases and sanitation could be had.
3. The size of this field presented a task difficult to control air vermin.
4. An encouraging number of young rabbits could be obtained from wild rabbits.

SECOND EXPERIMENT

Sanitary measures were taken on the open ground in this 45-acre field in preparation for a second experiment. Additional food plantings were made and all covers reconditioned. A brood stock of approximately 150 rabbits on the same 5-1 sex ratio was placed in the field during the winter of 1935-36. Less attention was given the field. Food costs were reduced to a low figure because of plantings and vermin control was practiced. Less trouble was had from hawks and owls due to the smaller concentration of rabbits. An appreciable lower cost per rabbit involved in this second experiment was noticeable in comparison with the first. Almost one and a half rabbits were taken from the field for each parent rabbit stocked, being an increase over the first experiment.

THIRD EXPERIMENT

At the Jasper-Pulaski rabbit experimental field for the

present season, a still lower number of breeders are being used while an entirely new plan has been concentrated on at the Wells County State Game Preserve. Here forty-one 12' x 36' pens have been constructed, each provided with cover, food and water, with one pair of rabbits to a pen. An accurate cost record is being kept and it is anticipated that complete control of this experiment will be obtained, whereas in the Jasper-Pulaski experiments it was not. Results cannot be predicted although they are encouraging. Probable experiments will be continued in the State's attempt to propagate this popular game animal.

EXPERIMENTS IN OTHER STATES

In many other states, particularly in the East, experiments in rabbit propagation have been conducted with unsatisfactory results. Some states are still conducting this work while others have abandoned it.

RESTOCKING

Indiana's source of rabbits for restocking purposes, as well as other states, has been provided chiefly by purchases from dealers in Missouri, Kansas and Oklahoma where cottontails are plentiful and where legislation has not forbidden the trapping and shipping of wild rabbits. However, there is a growing sentiment against this commercialization in these states and probably within a very few years, it will be stopped, making it all the more necessary for Indiana to continue efforts to provide a dependent source of supply.

In the past, surplus rabbits have been trapped on Indiana state owned properties and distributed to other areas and these properties are being constantly improved to produce more rabbits.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

ARTIFICIAL INCUBATION AND BROODING OF BOBWHITE QUAIL

System Used at Indiana State Game Farms

Foreword

Following is a detailed description of the artificial and mechanical method used by Indiana's state game farms in the propagation of bobwhite quail, used for stocking purposes in this state. Due to the recent adoption of this system, we are continually making improvements and success depends much on good common sense and judgment, the ability to see, understand and properly and promptly care for emergencies that often arise in artificial propagation and also the attention and care devoted to such a system.

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Sanitation is the rock foundation of this work and with proper sanitary precautions, disease is eliminated or at least controlled, avoiding disastrous returns on propagation investments.

Mating Breeders

A wood frame pen three feet wide by eight feet long by thirty inches high, entirely covered by three mesh hardware cloth is used as a breeding, growing and holding pen. Two feet of one end of this pen is enclosed to afford the occupants protection from weather, a retreat and hiding place and as this coop end is weather-proof it also affords dry feeding quarters where hoppers containing one to several days' food supply, according to the number of birds in the pen, can be used.

Hen quail generally improve in egg production as they grow older and it is our policy to retain all good layers from season to season. A young one-year-old hen usually produces twenty to thirty eggs in a breeding pen while the same hen four years old is apt to lay upward to sixty or eighty eggs during the summer.

During March, the quail are mated with one pair to a breeding pen. These pens are spaced at about ten foot intervals in checkered fashion in fields that had previously been prepared and planted in clovers. Equipment used in each pen consists of an 18-inch metal reel feed hopper, a one pint inverted glass watering fountain and a small hopper attached to one side of the pen in which chick size oyster shell, grit and charcoal is constantly kept before the birds. A good laying ration is provided in the 18-inch hopper and fresh water in the fountain. A large handful of dry-fine hay or grass such as blue grass is placed in one corner of the coop. Green foods such as lettuce and clovers are fed daily and such foods as apples and tomatoes are excellent additions to the diet. Unused portions of such food should be removed daily from the pens, with an effort being made to provide an amount that will all be consumed.

Breeding quail should be disturbed as little as possible and while the pen described above is vermin proof, all quail fields should be enclosed with a fence to exclude dogs, cats and ground vermin.

The most frequent causes for deaths in quail breeding pens are egg binding and egg breakage, and, of course, these always occur with the hen bird. Disease can normally be adequately controlled in the separated pen system by using strict sanitary measures in preventing its spread.

Egg eating is not common with quail breeders and when it does occur, whichever bird is involved can be determined by observation or isolation and when located the offenders usually are liberated.

Egg production starts about April first, with the hen bird making her nest in the materials previously provided. The first egg produced in each pen is marked with a pencil and left in the nest for the season. The rest of the eggs are gathered weekly with care being taken not to disturb the make-up of the nest and often a spoon can be used to good advantage in this operation. In an extreme hot period such as we had in the summer of 1936, it is necessary to gather eggs daily, due to the fact that incubation might start and cause the death of the germ upon moving such an egg into a cooler atmosphere or being subjected to a sharp drop in temperature which could follow a hot period.

Care of Eggs

The care and handling of eggs are of great importance in the production of a high percentage hatch and healthy chicks.

When eggs are received, either in a shipment or from a laying pen, they should be immediately placed in trays in a cool semi-darkened place, preferably a cellar, unless preparations have been made to set the eggs. Put about one inch of bran, wheat or other small grain over the bottom of the tray, placing the eggs in this in rows with small end of the egg down. Cull out any undersized, irregularly shaped, cracked or thin-shelled eggs. High temperatures, rough handling or sudden jarring must be avoided.

Eggs should be set within seven days from the time of receipt and if sooner, better results may be obtained.

Each and every egg should be considered and respected as an individual unit of life.

A fertile egg is divided into eight parts, as shown below, considering the egg as a unit of life:

First is the cuticle which is an outside protective coating against harmful microorganisms. For this reason, a dirty egg should not be washed with water, but instead should be gently wiped with a dry rag.

Second is the egg shell which is further protection against natural enemies.

Third is the shell membrane which is more protection against egg rupture.

Fourth is the air cell located in the larger end of an egg and which is a reservoir for respiratory gases.

Fifth comes the albumen which serves both as a reserve food and protection against jars.

Sixth and next is the yoke, being the principal reserve food supply and the birthplace of life.

Seventh are the white streaky cords attached to opposite ends of the yoke, known as chalazas. These are organs that support and regulate the position of the yoke.

Eighth and last is the Blastoderm, located on the yoke next to the albumen, which is the beginning of the chick.

Thus nature provides an intricate assembly insured to become a chick through proper incubation.

Incubation

Quail eggs are not so difficult to hatch as pheasant eggs. However, it is impossible for us to give incubating and hatching recommendations for all types and styles of incubators on the present day market. Please remember that what recommendations we give apply only to the equipment and experiments used on our state game farms. These recommendations might produce a complete failure on other types of equipment. In lieu of definite quail egg hatching data on incubating equipment except that which we outline, we would recommend following the manufacturer's instructions on chicken eggs and a fair result should be had.

Buckeye electric incubators with separate hatcher of a forced draft type are being used at our game farms in specially constructed incubator houses where a moist even temperature of 70 degrees is maintained. The following temperatures are for this type machine only. Eggs are incubated for 20 days at a temperature of $99\frac{1}{2}$ degrees with a wet bulb reading of 86 to 87 degrees, with all trays of eggs being turned mechanically every six hours. After 20 days of incubation, all eggs are candled in tray lots of 300 over a specially constructed reflector with infertile eggs being transferred to hatchery trays. A fertile egg will be spotlessly dark excepting the air cell located in the blunt end of the egg and light will show through this cell. A spot light tester can be used but this requires much more time as each egg is tested separately. The eggs remain in the hatching unit for three days when hatching starts and is completed on the fourth day. A $96\frac{1}{2}$ degree temperature is maintained in the hatcher with a 90 degree to 93 degree wet bulb temperature, providing a very high moisture content within the machine. All of our quail eggs under the above conditions hatch clean and together with all hatches above 90 percent and some as high as 96 percent.

The incubators we use are not made special for game bird egg incubation but are regular stock machines. We do add special made egg holders that insert in the regular hen egg tray and these are made out of small mesh hardware cloth by shaping a series of grooves in it over one-half inch pipe, with the grooves being worked by hand to take average size quail eggs.

Brooding

When quail chicks are about 24 hours old, thoroughly dried and have gained considerable strength after hatching, they are removed from the hatcher, counted and placed in warm, no draft, carrying boxes and taken to brooder houses equipped with electric brooders and already prepared to receive the chicks.

We use a specially constructed two-compartment colony brooder house with a capacity of 200 quail chicks, equipped with two special electric brooders. The floor of the brooder house is covered with about one inch of either peat moss or wood shavings litter with the latter being of a coarse type, preferably of white pine and free from dust and small particles. During the six weeks' period the birds are in the brooder house, litter is replaced

weekly after the floors and lower walls have been scrubbed and disinfected. Wet food or litter from watering vessels should be promptly removed.

Chicks are placed under the brooder which is regulated at a temperature of 99 degrees and confined to its limits plus an area of about one foot directly in front of the one open side of the square brooder. The chicks are held to this floor space for two days, then gradually given more room until at the age of nine or ten days the entire floor space is made available.

Temperatures are lowered two degrees on the fourth and seventh day and four degrees weekly after that until the current is turned off at the end of five weeks.

Ventilation is adjusted by a lower and upper ventilator, constructed on the front of the brooder house, causing cool air to enter the lower ventilator and circulate to the floor, up the back wall and ceiling and go out through the top ventilator. Ventilation is most important but must be used sparingly on young birds, being increased as they grow and given as much as possible without forcing too much draft or chilled air on them. This can be best regulated by watching the comfort of the birds, making sure they do not crowd and hover in bunches, which is a sign they are getting chilled. A chilled bird will stop eating, lose its pep and possibly linger for three or four days before dying. Contented and comfortable birds will keep moving and busy and do not crowd together when resting or sleeping. The brooder houses are equipped with large doors on the south side and these are kept opened during the day time in nice weather and all the time in good weather after the birds are upward to four weeks of age.

Each brooder compartment has a seven foot square screened sunporch located on the south side and quail at about fifteen days of age are given access to this, providing the weather is fair and warm, but until the birds are five weeks old, they are run back into the house each evening as temperatures start cooling. The sunporch can be left open during the chicks' sixth week. This is a hardening period, getting the birds ready for growing pens.

A special 30 percent protein feed, sprinkled with finely chopped tender lettuce, is fed on two eight inch square wood trays, one being placed underneath the brooder and the other used directly in front of the brooder. These are substituted by two eighteen inch metal reel hoppers as the birds grow enough to use the larger feeders. Feed is kept before them at all times. Glass water fountains fed from fruit jars containing warm water at first, mixed with a stock solution of B.K. disinfectant, furnish drinking water and for the first two days we use small rocks in this fountain to prevent the birds from getting or falling into the water. This feeding and watering system is continued throughout the six weeks period in the brooder house. Tender chopped green foods are most important and are fed often as well as fresh clean water. All feeding and watering equipment is scrubbed and disinfected daily and this equipment is used on 2-inch high frames covered with 3-mesh hardware cloth after the birds are a few days old and large enough to climb up on these frames.

Eliminating diseases, cannibalism or picking is a source of trouble if not properly controlled. The high protein feed is one factor in preventing cannibalism. Pine tar should be applied to those parts of a bird shown as picked, removing and isolating any

bad cases. Confinement of birds has a tendency to cause picking so sunporches should be used as much as possible. In a severe outbreak of picking, it is best to darken the brooder house and confine the birds to this darkness.

At the age of six weeks, brooder quail are moved to growing pens, which are the same type pen and equipped the same as described under "Breeders." Here quail growing feeds are gradually substituted for the starting feed with fine cracked grains being added when the birds are ten weeks old. The same care is given the growing pens as described under "Breeders" excepting these pens are moved over fresh ground every ten days until October when each pen is placed over a 4-inch high frame, putting the birds on wire hardware cloth that distance above the ground. Dirt is banked against the lower part of the coop to prevent winter drafts and birds are held over winter in this manner. Prior to spring distribution, holding pens are again placed back on the ground for two to three weeks.

Precautions

The following are a few precautions that should always be observed in the propagation of quail.

Sanitation must be first on the list, because without it success cannot be had.

Dispose of all dead birds by burning.

Never attempt to raise quail with chickens, turkeys or any domestic fowl or on ground that has been used for these. Quail are most susceptible to all fowl diseases.

Never use the same ground in consecutive seasons without first spreading fresh hydrated lime at the rate of one and a half tons per acre, allowing this to work on top and into the ground before turning under the soil and planting in green foods. Ground that is not limed should be sown in crops for three seasons before being used to the second time for quail.

Avoid Overcrowding

Moisture breeds disease so it is most important to keep wet litter and feeds cleaned out. Make sure all feeds that are used are fresh, clean and free from moisture.

EQUIPMENT AND SUPPLIES

Brooder houses and pens are constructed according to our plans.

Electric brooders are purchased from Lyon Electric Company, San Diego, California.

Special feeds come from Chapin and Company, Hammond, Indiana. Others - from local dealers.

ARTIFICIAL PROPAGATION OF OTHER UPLAND GAME BIRDS

Hungarian Partridge

With this species, the same system is used as with quail except about one half of capacities used with quail in pens and brooders are recommended for Hungarians.

Also, Hungarians cannot be force-mated but instead breeders are placed in fields to which mating pens of the quail size are attached and opened to the mating field in such a manner that pairs can be trapped in these pens. A hen Hungarian will pick

her mate and generally escort him to one of the series of breeding pens where the pair is trapped and remains for the laying season.

The Hungarian partridge is a much more nervous type bird in pens than quail and for this reason, we use precaution in disturbing them.

Chukar Partridge

We are entering our second season in artificially propagating this partridge with an expanded plan over our first season.

Our work so far with this species is almost identical with our quail system, excepting the size of this bird requires smaller capacities in our quail equipment. This bird might become a popular game bird in Indiana but until experiments are completed, we hesitate now to make any predictions whatever.

Pinnated Grouse (Prairie Chicken)

Propagation of this species has been totally unsuccessful with all those who have tried it.

Ruffed Grouse

In a few of the states, particularly where this bird is hunted, there has been propagation work for several years but it has only been in the last couple of years that a few of those experimenting have been able to produce upward to a hundred birds. However, improvements in artificial propagation is progressing and sometime will be on a basis where extensive stockings can be made.

Wild Turkey

This native game bird is not a difficult species to propagate artificially but our work has been limited to the production of a few dozens birds annually for experimental plantings in a few southern Indiana counties. These plantings have not warranted extensive propagation.

Artificial propagation can be conducted successfully in both the electrical system as outlined for quail and the bantam or hen foster mother method.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

ARTIFICIAL INCUBATION AND BROODING OF RINGNECK PHEASANTS
System used at Indiana State Game Farms

Foreword

The following is a detailed description of the artificial and mechanical method used by Indiana's state game farms in the propagation of ringneck pheasants, used for stocking purposes in this state. Due to the recent installation of this system, we are continually making improvements, and success of the system depends much on good common sense and judgment, the ability to see, understand and properly and promptly care for emergencies that often arise in artificial propagation and also the attention and care devoted to such a system.

Sanitation is of prime importance in this work and with proper sanitary precautions, disease is eliminated or at least controlled, avoiding disastrous returns on propagation investments.

Mating Breeders

Two systems are used in mating pheasant breeders, one being the colony manner and the other is known as the Harem system. Two-year-old hen pheasants should be mated with one-year-old cock birds and vice versa, when possible, using only strong healthy birds for breeders, mating five hens to one cock. A hen in captivity will produce more eggs when she is two years old, averaging approximately fifty eggs per season. However, only about 30 to 35 of these are usable for hatching purposes due to the short and limited rearing season for pheasants.

Using the colony system, about the first of March pheasant breeders should be moved from the holding or winter pen into a well drained laying pen which has been previously planted in a green food such as clover, alfalfa or wheat and allowing two hundred square feet for each bird.

If, for any reason, the birds are full winged and are to be placed in an open pen, care should be taken to clip the flight or first ten feathers on one wing or else a brail should be used on one wing.

Brush covers should be provided offering shade and a retreat for the pheasants from air vermin such as owls and hawks.

Ringnecks usually start laying in April. No nests need be made in the pen as the hens drop their eggs promiscuously. Often they will scratch out a nest if the soil is loose. A few coops may be scattered through the pen offering a hiding place for the hens to lay.

Using the Harem system of mating, place four, five or six hens with one cock in a small wire covered pen, four to six feet high by eight feet wide and fourteen feet long. Birds can be confined to a smaller area in this type of mating than in the open laying field.

Laying or any pheasant pen should not be used through two successive seasons without first heavily liming the pen with hydrated lime between seasons. After the lime has been worked into

the soil by rains, it should be plowed and planted into a green food. If the pen is not limed, it should be cultivated and not used for pheasants under every third year.

General care of laying pens consists of furnishing plenty of fresh, clean water, a good laying ration, supplemented with a supply of green foods if these are not already available in the pen and an ample supply of pullet size grit and oyster shell. Attention must be given to the general condition of the birds and hens showing signs of overtreading should be removed and isolated to prevent their death. Prompt removal of hens dying in pens is necessary and deaths are usually caused by one or a combination of three reasons, such as egg binding or breakage or overtreading.

Eggs should be gathered twice daily, in the late morning and late afternoon.

Egg eating is a bad habit that often develops in a flock usually started by eggs being accidentally broken in the field and carelessly left for birds to pick and also by soft-shelled eggs which are easily opened and eaten by the birds. Sometimes crows start this habit by flying into an open pen, breaking an egg or two and leaving parts to be picked at and consumed by the pheasants. The egg-eating habit can be controlled and eliminated by distributing a liberal supply of dummy pheasant eggs over the field, thus discouraging the birds after a few pecks at the hard dummy. Also, the pen should be kept clean of all broken and soft-shelled eggs. Crows can be eliminated by shooting.

Care of Eggs

The care and handling of eggs are of great importance in the production of a high percentage hatch and healthy chicks.

When eggs are received, either in a shipment or from a laying pen, they should be placed immediately in trays in a cool semi-darkened place, preferably a cellar, unless preparations have been made to set the eggs. Put about one inch of bran, wheat or other small grain over the bottom of the tray, placing the eggs in this in rows with small end of the egg down. Cull out any undersized, irregularly shaped, cracked or thin-shelled eggs. High temperatures, rough handling or sudden jarring must be avoided. Eggs should be set within seven days from the time of receipt and if sooner, better results may be obtained. Each and every egg should be considered and respected as an individual unit of life. A fertile egg is divided into eight parts as shown below, considering the egg as a unit of life:

First is the cuticle which is an outside protective coating against harmful microorganisms. For this reason, a dirty egg should not be washed with water, but instead should be gently wiped with a dry rag.

Second is the egg shell, which is further protection against natural enemies.

Third are the shell membranes, which are more protection against egg rupture.

Fourth is the air cell located in the larger end of an egg, which is a reservoir for respiratory gases.

Fifth comes the albumen which serves both as a reserve food and protection against jars.

Sixth and next is the yoke, being the principal reserve food supply and the birthplace of life.

Seventh are the white streaky cords attached to opposite ends of the yoke, known as chalazas. These are organs that support and regulate the position of the yoke.

Eighth and last is the Blastoderm, located on the yoke next to the albumen, which is the beginning of the chick. Thus nature provides an intricate assembly insured to become a chick through proper incubation.

INCUBATION

Pheasant eggs are far more difficult to hatch than chicken eggs and for that reason it is impossible for us at this time to give incubating and hatching recommendations for all types and styles of incubators on the present day market and please remember that what recommendations we give apply to the equipment and experiments used at the state game farms. These recommendations might produce a complete failure on other types of equipment. In lieu of definite pheasant egg hatching data on incubating equipment except that which we outline, we would recommend following the manufacturer's instructions on chicken eggs, and a fair result should be had. General requirements should be followed as far as possible, using a slightly lower temperature at center of pheasant eggs with more moisture and less ventilation than is used with chicken eggs.

Buckeye electric incubators with separate hatchers of a forced draft type are being used at the game farms in specially constructed incubator houses where a moist even temperature of 70 degrees is maintained. The following temperatures are for this type machine only. Eggs are incubated for 20 days at a temperature of $99\frac{1}{2}$ degrees with a wet bulb temperature of 86 to 87 degrees, with all trays of eggs being turned mechanically every six hours. After 20 days of incubation all eggs are candled in tray lots of 200 over a specially made reflector with infertile eggs being removed and fertile eggs being transferred to hatchery trays. A fertile egg will be spotlessly dark excepting the air cell in a small portion of the large end of the egg and light will show through this cell. A spot light tester can be used but this requires much more time as each egg is tested separately. The eggs remain in the hatchery for approximately four days before hatching at a $96\frac{1}{2}$ degree temperature and about 90 degrees wet bulb temperature.

A more recent improvement, which we have not yet had the opportunity to try on a large scale, has given better hatches of between 85 and 90 percent. This method requires incubation for 20 days as above shown in a forced draft machine, then transferred to a still air incubator converted into a hatcher with a temperature of 103 degrees in the top part of the hatcher or above the eggs. Pans of water are maintained underneath the egg trays and a natural ventilation of cool air enters the bottom and goes out the top of the cabinet causing a lower temperature at the center of the eggs. A hygrometer reading of 65 to 70 percent must be maintained with 103 degrees temperature, making a dripping wet condition within the hatcher. Doors to hatchers must be kept closed during the four day hatching period and only opened after chicks have dried and are ready to be removed on the fifth day.

While there are improvements to be made in hatching pheasant eggs, the combination forced draft and still air method appears to be the best.

Brooding

When pheasants chicks are about 24 hours old, thoroughly dried and have gained considerable strength after hatching, they are counted and placed in warm, no draft, carrying boxes and removed to brooder houses equipped with electric brooders and already prepared to receive the chicks.

We use a round Jamesway brooder house of 104 square feet of floor space equipped with a forced ventilated 56" round Lyons electric brooder under which we place 250 pheasant chicks, however for beginners we would recommend a capacity of 150-175 chicks.

The floor of the brooder house is covered with from one to two inches of either peat moss or wood shavings litter with the latter being of a coarse type, preferably of white pine and free from dust and small particles. During the six weeks period the birds are in the brooder house, litter is replaced weekly after the floors and lower walls have been scrubbed and disinfected. Wet litter or food from watering vessels should be promptly removed.

Chicks are placed under the brooder which is regulated at a temperature of 99 degrees and confined over the first night by an 18" high two mesh hardware cloth fence which is lengthened out on the second, third and fourth days until the entire floor space of the house is made available.

Temperatures are lowered two degrees on the third and sixth day and five degrees weekly after that until the current is turned off at the end of the fifth week. Also during the heat on warm days, the current can be turned off but should be switched back on as the cool of the evening approaches. Ventilation is properly cared for mechanically underneath the brooder but must be regulated in the brooder house first with just a small amount through the side and top ventilation on the house and increasing this with the age of the birds until both windows should be used in good weather, watching the comfort of the birds in preventing over-ventilation. Likewise, as the chicks grow, the brooder can gradually be raised from the floor starting with one inch when the birds are six days old. Here, care must be taken to watch the comfort of the birds again making SURE they do not chill which causes them to crowd and hover in bunches. Contented and comfortable birds will keep moving and busy and do not crowd together when resting or sleeping.

A sun porch 6' wide by 10' long with a 3-mesh hardware wire cloth floor a few inches off the ground is used on the west side of the brooder house, connected by a small opening with sliding door. In good warm weather, pheasant chicks are given access to this porch in early afternoon at about six days of age. At ten days old, they are given the use of an outside run, constructed out of a 150' roll of 72"x3/4" or 1" mesh wire netting. The ground this pen covers should previously have been planted in small clovers to afford cover and a supply of green food and is located in a manner as shown in accompanying sketch to afford

space for a second pen to care for a second brood of pheasants.

Permanent pens can be constructed if so desired.

Shade and small brush shelters are provided in these pens. In warm, balmy weather, and after the cool of the early morning has disappeared, chicks are given these outside runs but are driven back into the brooder house each evening until they are five weeks old. For their sixth week, the door to the run is left open. Strict and prompt attention must be given the runs in case of sudden storms or drops in temperatures when the young pheasants must hurriedly be driven into the houses.

A special 30% protein starting feed, sprinkled with finely chopped tender lettuce, is placed on two small wood trays underneath the brooder along with an inverted fruit jar type water fountain, containing warm water mixed with a stock solution of B-K disinfectant and chicks are started immediately on this. Additional trays and fountains are added the following day when additional floor space is given the birds with the trays gradually being replaced with 18" metal reel feed hoppers. This feeding and watering system is continued throughout the six weeks period in the brooder house plus the addition of a growing feed to the starting feed, during the last three days of the period. Tender chopped green foods are most important and should be fed often. Fresh clean water is always kept before the birds. After pheasant chicks are three weeks old, tender lettuce can be fed in small wire baskets hanging within their reach off the floor which also helps to keep the birds busy. Thirty-six inch feed hoppers are added to the feeding equipment when the chicks are about three weeks old. All feeding and watering equipment is scrubbed and disinfected daily. All feeding and watering equipment is used on 2" high frames covered with 3-mesh hardware cloth after the birds are a few days old and large enough to climb up on these frames.

Eliminating diseases, cannibalism or feather picking is a source of trouble if not properly controlled. The high protein feed is one factor in preventing cannibalism. Other measures to use are to darken the brooder house windows with lamp black in oil applied on the inside, apply pine tar to those parts of a bird shown as feather-picked, removing and isolating any bad cases; and keeping the flock in the outside ground runs as much as possible during daylight hours.

Growing and Holding

At the age of six weeks, brooder house pheasants are moved to covered growing and holding pens with cocks and hens being separated and placed in separate pens. This division is completed a few weeks later when the sex is more definitely defined as at six weeks of age mistakes in identifying sex can readily be made. In separating pheasants at this age, we have found that more hen birds can be held together than cock birds with a much lower percentage of feather-picking and mortality from this. In growing and holding pens, we allow about 60 square feet of ground per hen pheasant and approximately twice that amount for cock birds.

When the pheasants are moved to the growing and holding pens, they are continued on the same feed as they were last getting in

the brooder houses with a gradual change to the growing feed. A mixture of chick and pullet size grit and oyster shell with charcoal added is provided in all pens. A growth of green foods in clovers and rape had previously been planted in all fields supplying an ample amount of this important feed. Fresh, clean water mixed with B-K is kept before the birds at all times. At eight weeks of age a small amount of fine cracked grains such as corn, milo maize, wheat, buckwheat, soy beans and millet is gradually added to the growing feeds and increased in size and amounts as the birds grow older until all grain is being fed. The grains mentioned above are used as these are produced on our farms. However, there are many other combinations that are good. A larger hopper is used effectively in all growing and holding pens. Watering vessels used are granite, 5 quart size pudding pans.

Six feet wide by twelve feet long wood shelters, 3 feet off the ground, are provided in all growing and holding pens at the rate of one for every forty hens or twenty cocks. These are open on all sides until about November 1st, the north and west sides are closed tight for the winter.

Pheasants are ready for distribution at twelve to fourteen weeks of age. However, it is our policy to hold over winter our full capacity and make spring liberations.

Precautions

The following are a few precautions that should always be observed in the propagation of pheasants:

Sanitation must be first on the list because without it, success cannot be had.

Dispose of all dead birds by burning.

Never attempt to raise pheasants with chickens or on ground that has been used for chickens. Pheasants are susceptible to all chicken diseases, particularly so while they are chicks, growing more immune to such diseases as they mature.

Never use the same ground in consecutive seasons without first spreading fresh hydrated lime at the rate of one and a half tons per acre, allowing this to work on top and into the ground before turning under the soil and planting in green foods. Ground that is not limed should be sown in crops for three seasons before being used a second time for producing pheasants.

Avoid overcrowding.

Moisture breeds disease so it is most important to keep wet litter and feeds cleaned out. Make sure all feeds that are used are fresh, clean and free from moisture.

Equipment and Supplies

Brooder houses are purchased from James Manufacturing Company, Fort Atkinson, Wisconsin.

Brooders from Lyon Electric Company, San Diego, California.

Special feeds from Chapin and Company, Hammond, Indiana.

Other, from local dealers.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

SYSTEM OF GAME DISTRIBUTION IN INDIANA.

The greatly increased production of game birds and animals on Indiana state game farms, supplemented by purchases of game, is filling a greatly needed requirement to make more and better hunting in Indiana and in doing so has created a task and duty for game wardens that is second to none.

Our distribution system has been changed and improved during the past few years to keep pace with rapid progress being made in stocking game in Indiana's field and woods. The present system has been perfected by studying the merits and faults of distributing game since the advent of game propagation farms and it is imperative that all wardens be exacting in following the system as it is hereinafter outlined.

Prompt Handling of Forms Necessary.

Promptness of wardens in properly executing all game distribution forms and returning these to the central office both expedites and perfects the system and helps to bind a necessary closer relationship between this central office, the wardens and the game farms. Deviations or changes in these methods can only be made after authorization is obtained through the Department's Central Office.

Four species of game--quail, pheasants, rabbits and raccoon--are chiefly stocked in Indiana at this time. However, the system applies to all species.

Location Chart.

One form in triplicate (three copies) is known as a location chart and is printed for the four main species of game handled by wardens. These are headed according to the species, such as "Locations for Liberations of Quail", with a series of blank spaces to be completed by the warden, giving required information. The blank spaces consist of the following:

Name of Warden
County
Date
Number
Name of Owner of Farm
Number of Acres
Does Owner or Tenant Live on Farm
Number of Miles and Direction From Nearest Town. Name Town.
Is Farm Posted Against Hunting (Answer yes or no)
Name of Club Sponsoring Location
Number Liberated
Date Liberated

All of these have been properly filled in by wardens in the past, with the exception of two columns, and in both cases the columns are not sufficiently explained. One is the first column on the left headed "NO.", meaning number, and this means the number of locations to be numerically shown, such as 1-2-3-4-5, etc. The other column is that headed, "Is Farm Posted Against Hunting--Answer Yes or No." The meaning of this would be more

satisfactorily explained if it read "Is Hunting Prohibited-- Answer Yes or No." The next reprint of this form will show that change.

The location form is in three parts and three colors, the first sheet being white, the second yellow and the third blue. This form is sent to every warden receiving game, along with the number or allotment of each species he will receive for each county or part county that is in his territory several days prior to arrival of the game. By using carbon paper, this form should be completed with all columns filled in, excepting the last two showing the number of the species liberated and the date liberated. The white copy is to be returned to the Central Office within ten days. The main reason and benefit of this copy is that the Central Office has the opportunity to review the locations and make corrections if necessary before the game is liberated. Also, it provides in our files an approved chart from which proper distribution could be made in case the other two copies remaining with the warden would not be available, caused by misplacing them, loss, sickness or other reasons at time of arrival of game. The two remaining columns, on the blue and yellow copies, are to be completed on the liberations, with the yellow copy being sent promptly to the Central Office and the blue copy being retained by the warden for his future reference. Upon receiving the yellow copy, the files in the Central Office are completed, showing the number of birds or animals liberated on each location and the date of liberations. Please note that both before and after liberations, many references are made to both the white and yellow copies in the Central Office in routine work, and a closer relationship is immediately established on game distribution between that office and the wardens.

Source of Shipments.

Game for liberation originates from two different sources. First, from state game farms and second from purchases. The stock from the game farms is distributed in two manners, either by prepaid express shipments or by truck delivery, after notification as to day, time, point of delivery and amount of game, has been made. Crates containing raccoon or rabbits received from game farms by either express or truck should be emptied and returned promptly by express collect, unless other instructions have been given, to the farm making the shipment. This is important because neglect in returning this equipment causes delay in other shipments. Paper fabricated boxes in which quail and pheasants are delivered do not need to be returned. However, if any of these boxes are salvaged in good condition, it would be a saving to the Department for the wardens to store them in a dry place for pick up by the game farm trucks on later deliveries. Express deliveries are always made to the warden's home address unless otherwise notified. Truck deliveries are always made to the east side of Court House, at county seats, unless otherwise notified. In towns that are not county seats, the postoffice is the meeting place.

Amount of Game in Containers.

Pheasants and quail are boxed at the rate of 100 birds to 16 boxes with 6 birds in 12 boxes and 7 birds in the other four. Rabbits are crated in special boxes containing 12 compartments with one rabbit to each compartment. Raccoon are crated with either one or two to a compartment. Game birds for liberation must not be handled at all. Rabbits must be handled only by lifting them by both ears from the crate and releasing them immediately. Raccoon do not need to be handled as they will leave a shipping crate after the door is opened, if given a little time.

Releases in Lots.

Now, a Department rule which must be enforced is that quail, pheasants and rabbits shall be liberated in lots of six or seven, making one box of birds, or one-half crate of rabbits constitute one liberation. One, or not more than two, raccoons will constitute one liberation. These rules are set out for strict observation due to past experiences that have shown when birds and rabbits are handled they are often injured causing their deaths or crippling them. Another reason is that the numbers shown above are a proper amount for stocking purposes as determined by past liberations.

Release of Purchased Game.

The other source of game distribution from purchases of game that is shipped direct to game wardens requires other form work, which is necessary in this system to complete files, payments for game, etc. This might be in varied arrangements according to our purchase contracts and wardens will always be notified accordingly. But in most cases of wardens receiving game from shippers, it is necessary to complete the Department's "Acknowledgment of Goods Received" form, showing name of shipper, number and species of live and dead game received, date and signature of warden. These must be filled out, signed and returned to Central Office promptly. Payment for collect express is usually made through this office but copies of express waybills must be sent in to complete payments.

Allotments.

The allotments of game to counties depend much on the amount of game held at farms and contracted for purchase. These amounts are never definite, due to two reasons. First, it sometimes occurs that contracts made on purchased game cannot be fulfilled and other contracts cannot be made. Second, it is always possible and might occur that the numbers of game held at state farms for distribution might be greatly depleted from an outbreak of disease or other causes between the time the allotments are scheduled and deliveries are made. This has not happened in the past but might at any time. Both are causes that are beyond control and for that reason allotments cannot be made definite, yet it will always be the intention of this Department to complete every schedule made.

Care in Selection of Habitats.

Liberations should always be made in good food and cover conditions and food should be provided in case of snows or ice occurring after liberations. Raccoon should be liberated up den trees to give them protection until they are acquainted with their new environment, and this is most important in spring liberations when bred females from state farms are distributed. Food in the form of corn is always obtainable and should be scattered at liberations. Encouragement in putting up hand made dens should be pushed.

It is strict policy of this Department to liberate game on farms where hunting is permitted. This does not necessarily mean that you should not permit game to go on posted properties, but make sure such posted lands allow hunting with permission, and that this permission includes more than one or two or three special privileged hunters. Deviations from this policy must not occur because of repeated criticisms reaching the Central Office when it does happen.

Correct Liberation Methods.

Game birds should be released by placing a box in heavy cover, but first fold the flap door in the end of the box underneath and at the same time keep the opening closed with one hand. When the birds are completely settled and quiet, move several feet back as quietly as possible. Feed should be scattered at the liberating point prior to the opening of the box. This method provides the desired results in that the birds normally walk out, start feeding and stay together in a new home with which they are totally unfamiliar rather than flushing and getting widely separated.

Field Trial Birds.

Field trial quail are to be released by wardens in the manner as shown above and under no conditions are birds to be held for release on the day of the trial or in front of competing dogs. Field trial quail will usually be delivered to wardens from one to two weeks prior to the opening date of the meet for liberation at that time.

Equal Distribution Over County.

A most important point that every warden needs to consider and carry out is that there are probably many areas in every county that are not represented by organized Conservation clubs, that actually represent about forty percent of license buyers, and such areas cannot be neglected in distribution of game. It is the duty of each warden to see that these unorganized areas are properly handled and not overlooked. The Department, of course wants to continue to give full cooperation with all Conservation organizations in the distribution of game, but at the same time, liberations must cover areas not participating in club distributions. A warden once said that he received sixteen boxes

of birds to divide among thirteen organizations and that he had to remove birds from three boxes and divide them accordingly. This is wrong. These three extra boxes could have been handled by the warden himself in areas in his territory not represented by the thirteen clubs or he could have all the club participate in stocking a certain area, then moving to another area when such a situation arose again. Even combined club liberations of all or larger parts of an allotment of game than shown in the above example can be advocated for sections, moving to new areas with new allotments.

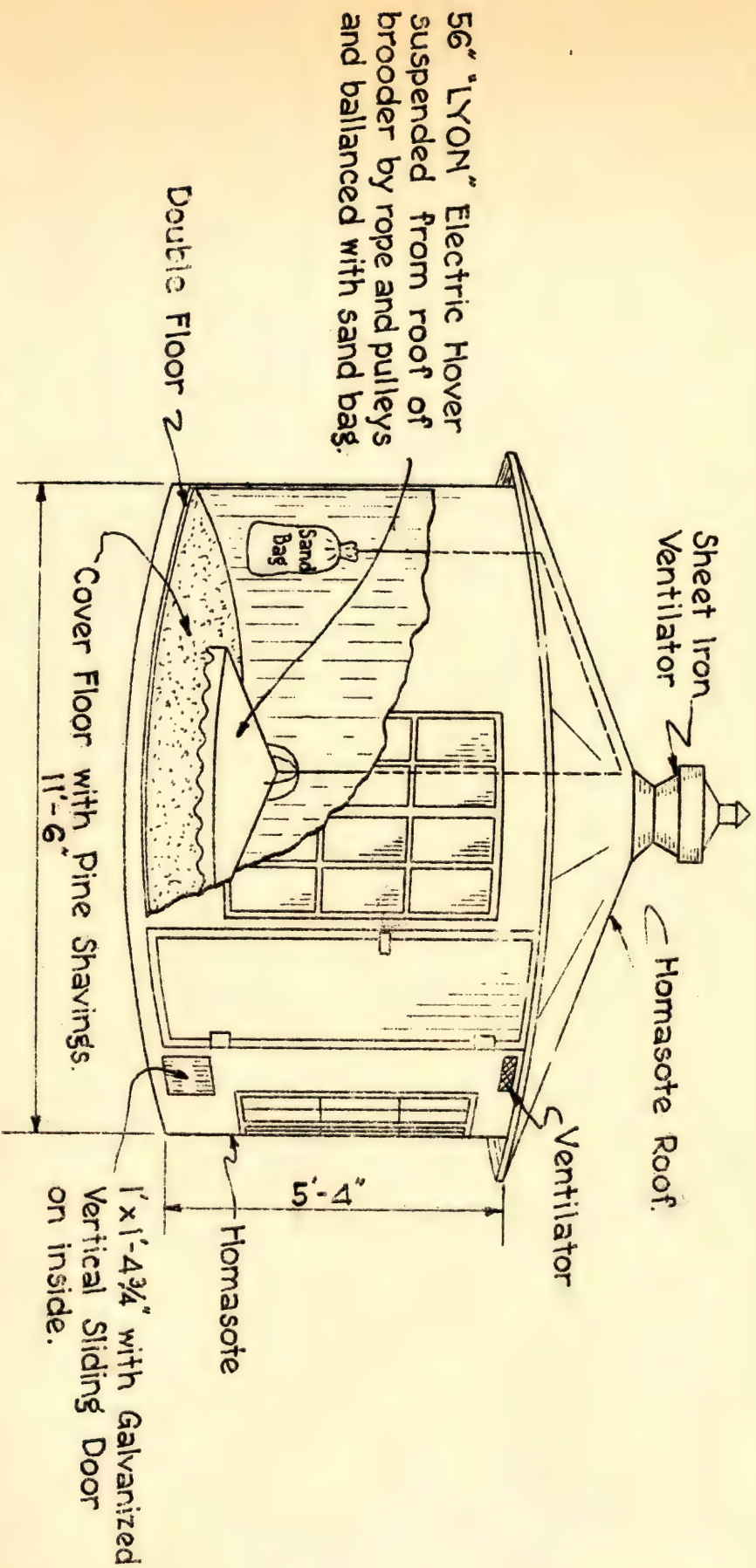
Liberation Time.

It has often been asked by sportsmen why the Department liberates game in February or March instead of April and May, at which time weather and food conditions would be better. There is only one reason, which is the breeding season of game birds and animals, starting with some species in January and continuing through the spring. For instance, raccoon and rabbits often start breeding in January and seldom later than February. Game birds start in February and March. These breeding season periods start fighting among all species of game and it is impossible to continue holding this game in game farm holding pens due to heavy losses caused by this fighting, so it becomes imperative to empty our holding pens not later than March.

NAME OF WARDEN _____ COUNTY _____ DATE _____

[illegible]

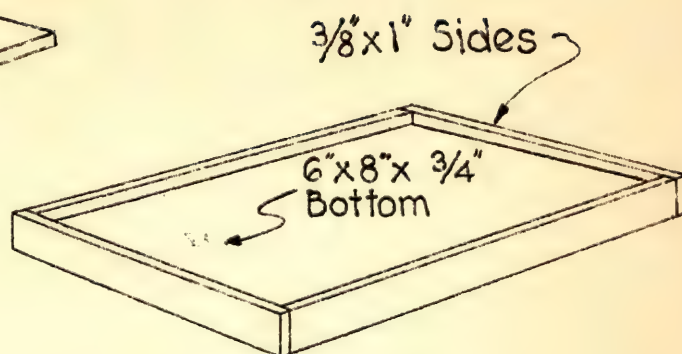
PHEASANT BROODER HOUSE



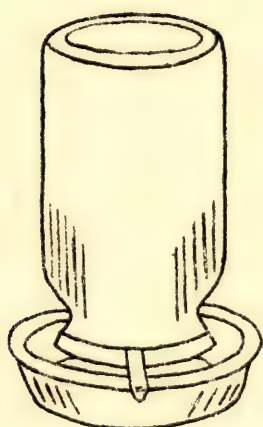
Capacity of Brooder House - 200 to 250 Chicks.
 Floor Space - 104 Square Feet.



8" x 24" TRAY FOR FEED
HOPPER & WATERING FOUNTAIN.



6" x 8" WOOD TRAY.



GLASS PAN
WATERING FOUNTAIN.



18" METAL REEL
FEED HOPPER



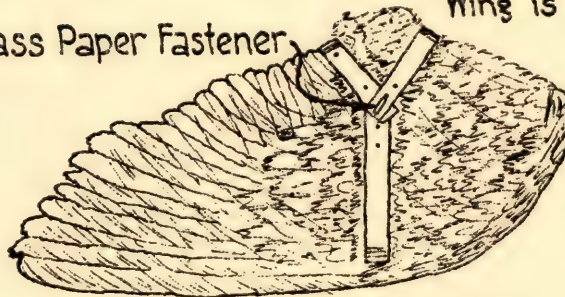
Under side of Left Wing.



Brail

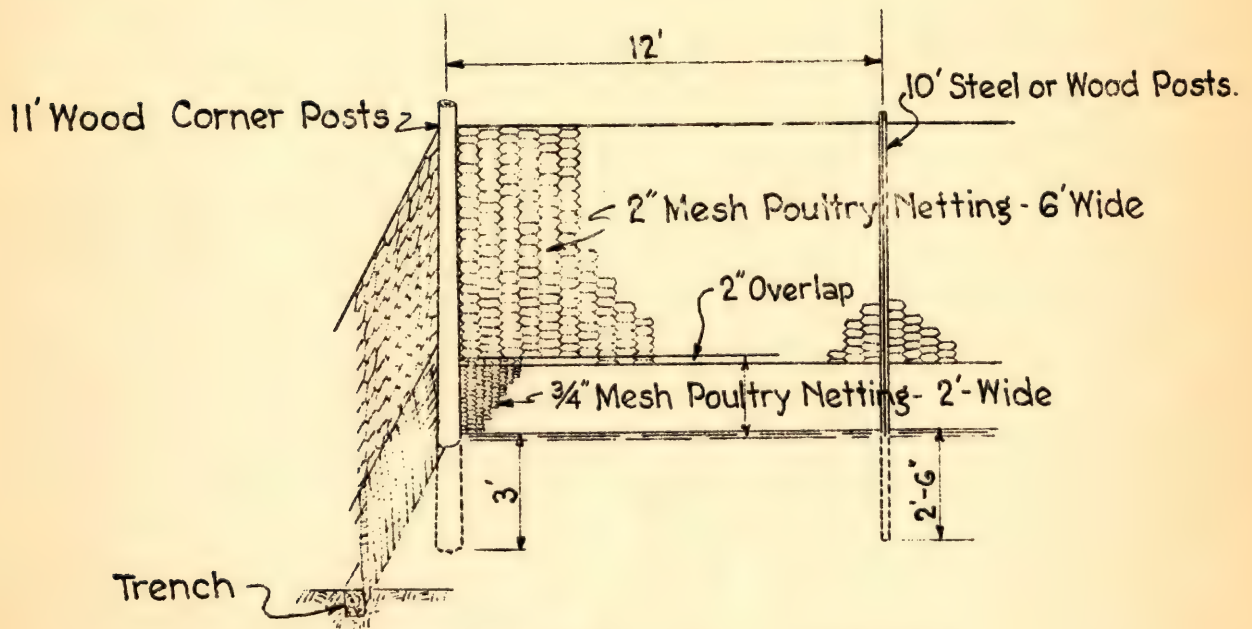
NOTE:- Only one Wing is Brailed.

$\frac{3}{4}$ " Split Brass Paper Fastener

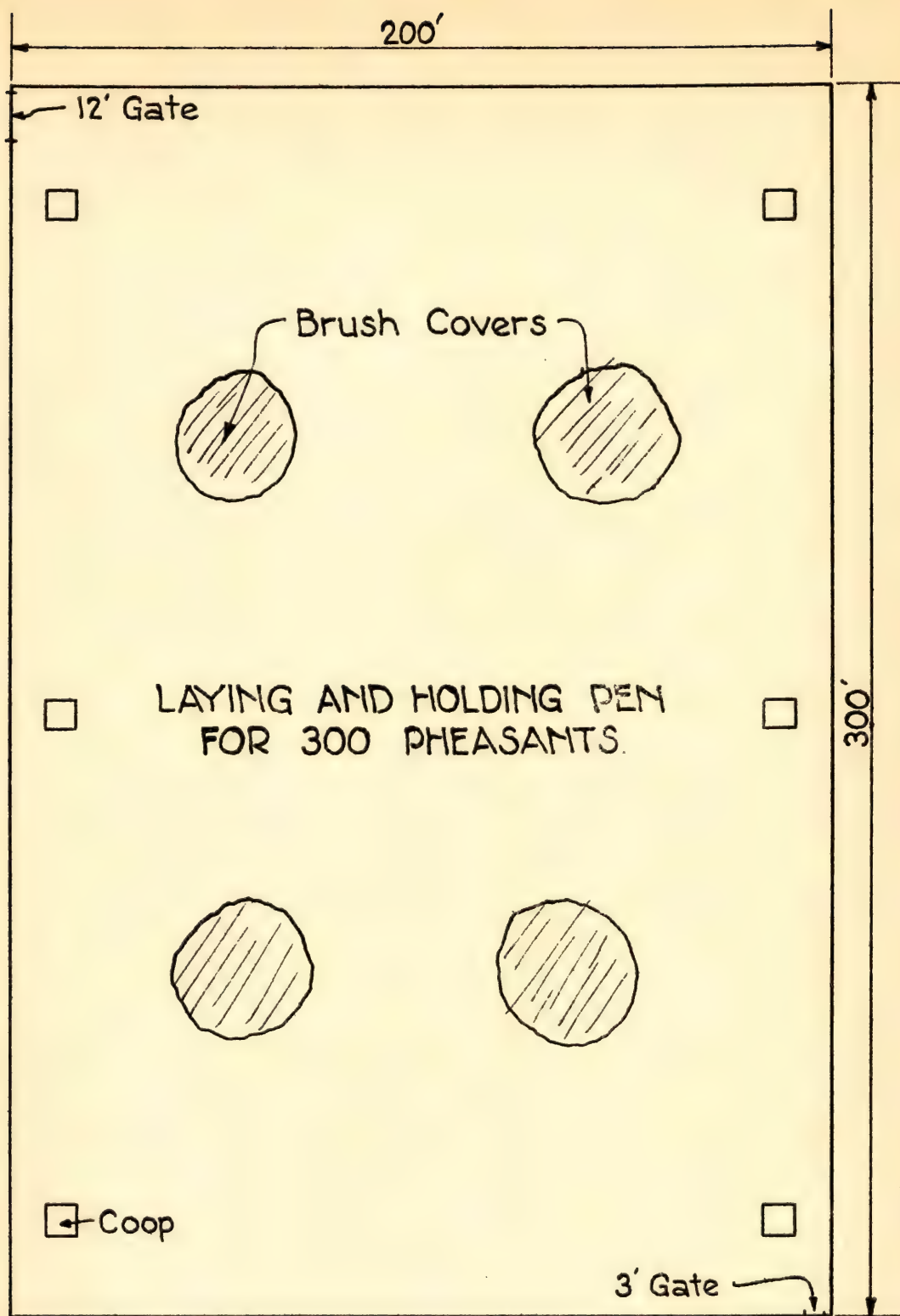


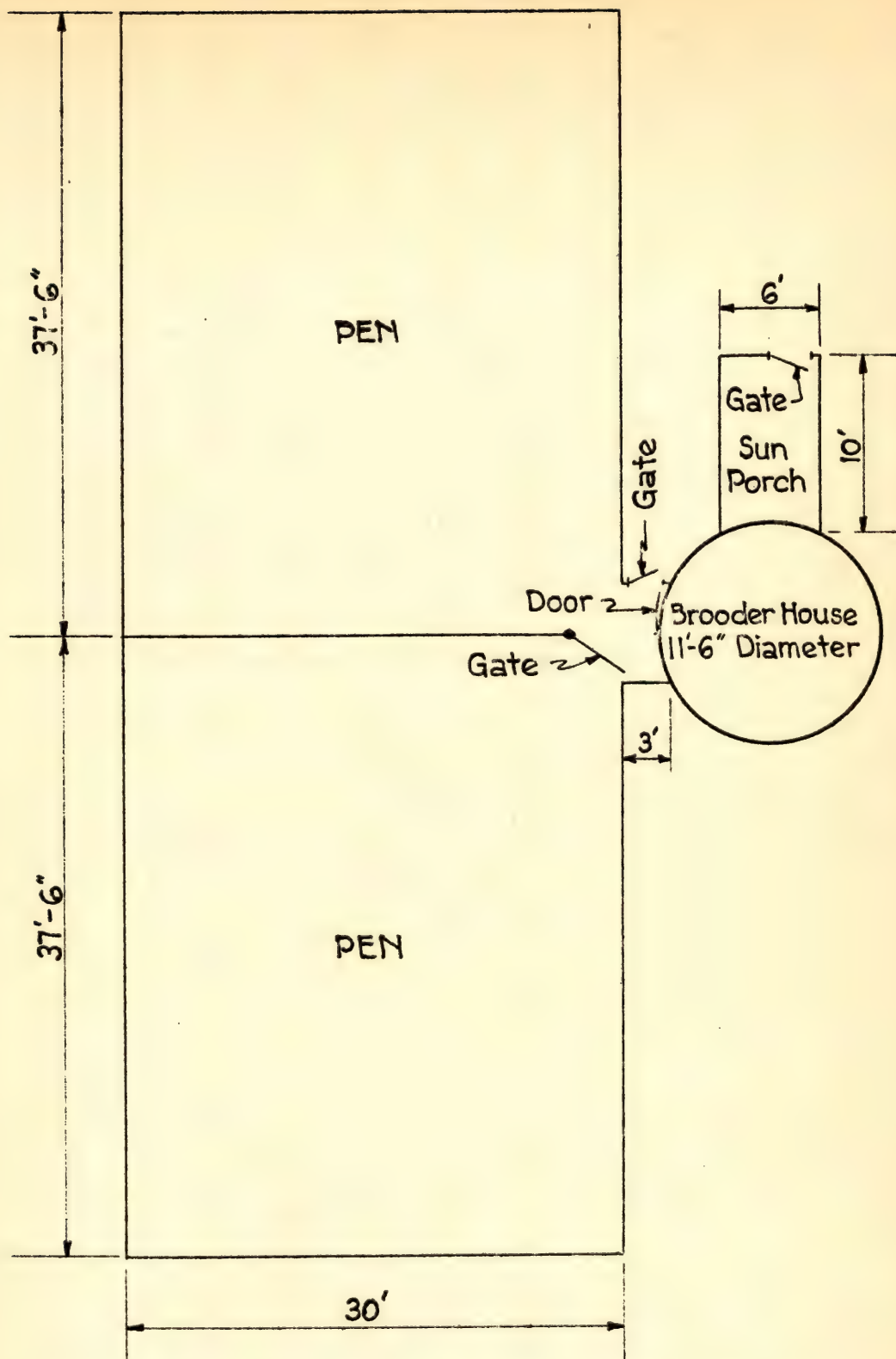
Upper side of Right Wing.

METHOD OF ATTACHING A BRAIL.

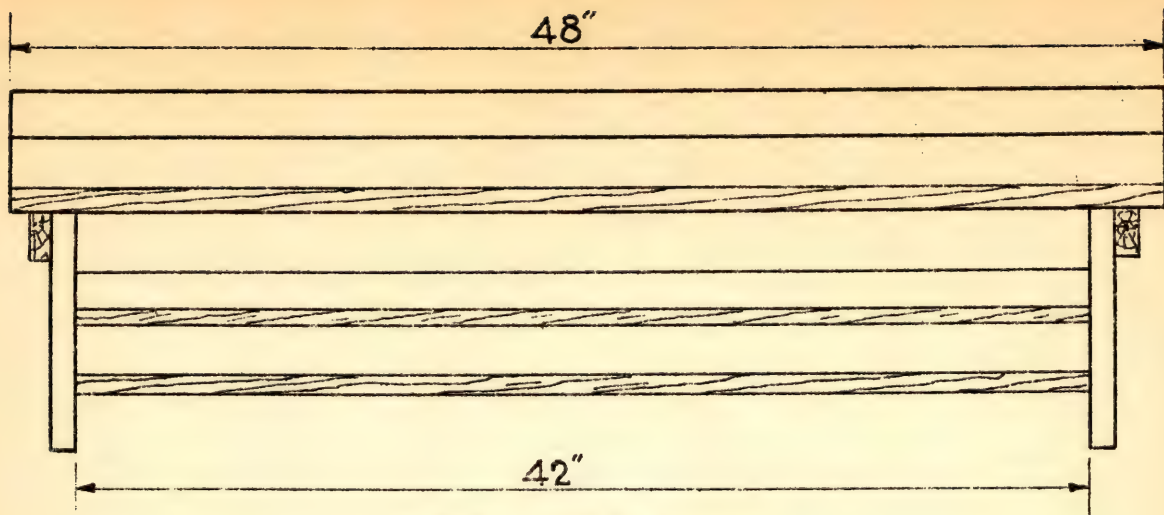


PHEASANT PEN FENCE

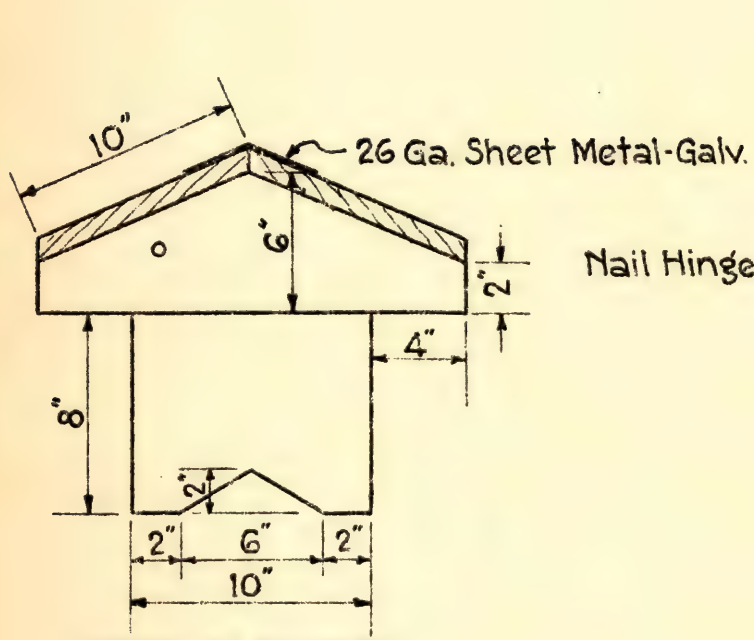




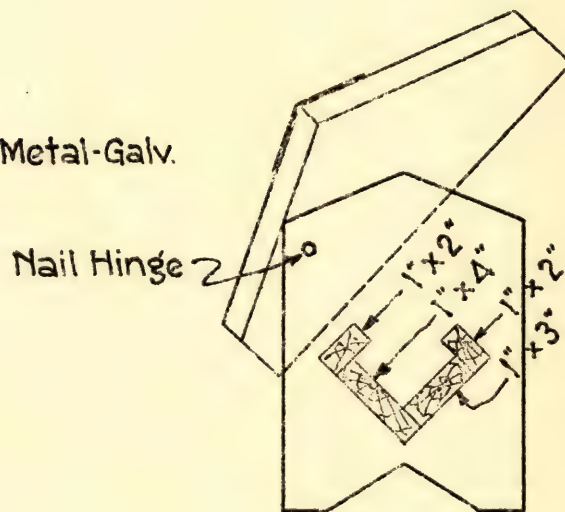
SKETCH SHOWING PLAN OF
BROODER HOUSE, PENS AND SUN PORCH.
Scale- 1" = 10'



FRONT ELEVATION



END ELEVATION
Top Closed.



SECTION
Top Open.

MATERIALS REQUIRED.

10½ Lineal Feet of 1" x 10" Boards.

3½	"	"	"	1" x 4"	"
3½	"	"	"	1" x 3"	"
7	"	"	"	1" x 2"	"
3	"	"	"	1" x 6"	"
4	"	"	"	6" x 26 Ga. Galv. Sheet Metal.	

MATURE PHEASANT FEEDING PEN

Scale - 1/8" = 1"



AMERICAN
RED-SHOULDERED HAWK



RED-TAILED
HAWK



POUCH-LEGGED HAWK

WHITE RUMP PATCH
BROAD WINGS
BROAD "FAN" TAIL



ABOVE

DARK
PHASE



COOPER'S HAWK
BROAD WINGS
LONG NARROW TAIL
CROW SIZE



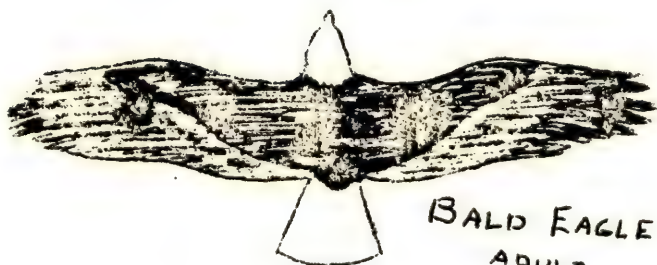
MARSH
HAWK
MALES



WHITE RUMP PATCH
LONG WINGS-NARROW
LONG TAIL



SHARP-
SHINNED
HAWK
BROAD WINGS
LONG TAIL



BALD EAGLE
ADULT



OSPREY



TURKEY VULTURE

COMMON BIRDS OF PREY in FLIGHT

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

BIRDS OF PREY

Page 1.

Birds of prey have always occupied a rather unique, if not uncomfortable position, in their relationship to mankind. Since time immemorial, these fierce birds have been used as symbols of might, and their likenesses may be found on coins, medals, and in the archives and records left by ancient peoples. The Assyrians, dwelling in the plains of Asia Minor, considered falconry as the sport of kings. Thousands of years before that time, the great mongol raider, Kubla Khan, found an exhilarating recreation in the chase with the hawk. In later, medieval ages, the princes of Europe had trained falconers among their retainers, whose duty it was to develop fine hawks for the chase. Even today the sport of falconry has a following, and in remote parts of India there are primitive people who depend upon the trained hawk as a supplier of food.

However, over most of the world, the status of the hawk has changed considerably. Instead of being the hunter, he now finds himself the hunted. For today we have developed far superior methods of getting food, and much different types of sport. In most kinds of hunting today the hawks, and owls are considered as thieves who rob the sportsman of a part of his bag. There is a slight tendency to afford the predators more protection, purely because of their esthetic values. And within the last few years, game managers have come to realize that certain of the hawks and owls, may actually benefit the hunter rather than decrease his bag.

The role of the predator in the balanced condition of nature in existence when this country was discovered, was that of a check upon certain species of wildlife. We have found that there exists a very complex relationship between plants, between animals, and between plants and animals. If a check is removed accidentally, by disease or famine, or another natural cause, there is an immediate, if slow, compensating process started which will eventually curb the increase of the unchecked form of wildlife. The predators, under primitive conditions, might be considered as temperate compensators. They do not keep down a species of animal life by destroying large numbers, but by killing, or controlling, a small number over widespread territory, and a long period of time. One might use the analogy that the predators are nature's safety valves. When there is a danger of over population, and hence epidemic disease which might wipe out the species, the predators go to work and reduce the number to a point below saturation, or to safety.

One important part which birds of prey play in a modern environment is a point which is closely related to the natural check which they place upon certain species of animals. Farmers wage a continual battle against the ravages of mice in the fields and around their farms. A great amount of money is spent every year

in an effort to curb the increase in the numbers of these obnoxious rodents. It has repeatedly been shown that a large proportion of the food of the broad winged, or common "hen hawks", is composed of rats and mice. You have seen them cruising about over open fields, sometimes high in the air and sometimes down, near the ground. I, myself, have seen Rough-legged Hawks "stooping" repeatedly in an effort to catch a field mouse which was scurrying frantically from the cover of one bunch of grass to another. After watching this display of aerial maneuvers, which led to the ultimate death of the mouse, one could say readily that if they had that hard a time catching a field mouse, they'd not get very far trying to catch a quail!

One should take into consideration that despite the investigations which have been made in the past, and which are being made at present, there remains a great deal to learn, and many misunderstandings to interpret correctly. The best the sportsman or game manager can do is to shape his policies with regard to predators in the light of the most up to date knowledge. In general it may be said that the annual mortality of game due directly to predators, in a given species, and on a given range depends upon these five variables: (Leopold: Game Management)

1. The density of the game population.
2. The density of the predator population.
(1 and 2 determine the game: predator abundance ratio)
3. The predilection of the predator, that is, his natural food preferences.
4. The physical condition of the game and the escape facilities available to it.
5. The abundance of "buffers" or alternative foods for the predator.
(5 in comparison with one, determines the relative abundance of various finds of prey)

It is a fact that certain kinds of Hawks and Owls do prey to a large extent upon birds, among which there is a considerable proportion of game species. There is no doubt that for intensive game management predator control is necessary. Extensive game management probably calls for control of the Accipiters and the Great-horned Owl. The hunter has a right to defend his sport against the ravages of these species. They are killers and meat eaters. But at the same time it is well to remember that the birds of prey have their values. They have their good points as well as their bad. The most sensible thing to do is to weigh the evidence, pro and con, and then decide as to the extent of the control which should be invoked.

It would hardly be worthwhile for us to go into a detailed discussion of the theory of predator control at this time. The best we can hope to do is point out the complexity of game; predator relationship. As time goes on more information, better interpreted will lessen the darkness which surrounds us in this field, and ease the conflict which now rages between the sportsmen, nature lovers, game managers, and farmers.

FAMILIES AND CHARACTERISTICS OF BIRDS OF PREY.

From the foregoing paragraphs it can be seen that a thorough knowledge of the birds of prey and their habits has a pre-quisite, the ability to identify the various species in the field. It is a common criticism that the average sportsman does not know one hawk from another, and that often they condemn absolutely harmless hawks for crimes which other predators commit. It would require a great deal of effort to become acquainted with each of the hawks and owls which at some time or another come into this state. Some of them are hard to identify with certainty even when in the hand. But there are a few general characteristics which differentiate the common groups of hawks, which can serve as common denominators in field study. These "common denominators" or field marks may be readily compared by reading the text and noting the differences in flight outline as indicated on the identification chart.

The true diurnal birds of prey are classified in the order Falconiformes. In this order there are three families and nine sub-families. There are fifty-eight species in the various sub-families but only sixteen species have ever been noted here in Indiana. They are carnivorous birds with a curved beak, hooked at the end; feet adapted for perching and provided with strong sharp claws.

The nocturnal birds of prey are classified in the order Coraciiformes. They are arboreal birds with short legs. There are seven sub-orders and eighteen families in the world. In this order, with the Owls, we find the Kingfishers, Humming birds, Woodpeckers, Goat-suckers, Rollers and Swifts. Owls possess large, rounded heads, strong legs, feet armed with sharp claws, strong bills with the upper mandible curved downward, large eyes directed forward and surrounded with a radiant disc of feathers and soft, fluffy plumage which renders them noiseless during flight. Only about seven Owls have ever been reported from Indiana. For our purposes it will be sufficient to discuss only those birds of prey which occur commonly in Indiana.

VULTURES: CATHARTIDAE

Vultures are great blackish Eagle-like birds, usually seen soaring in wide circles high in the heavens. Their naked heads are so small for the size of the bird that at great distances they sometimes appear to be almost headless. Hawks and Eagles have large well-proportioned heads.

Turkey Vulture: Cathartes aura SEPTENTRIONALES

This species, the most common one by far in Indiana, is very nearly Eagle size with great ample 'Two-toned' blackish wings. At close range the red naked head is a sure identification mark. However, young birds have black heads and are sometimes mistaken for black vultures.

Black Vulture: Coragyps atratus atratus

One of the best points of difference between this black headed species and the Turkey Vulture is the comparatively short tail which scarcely projects from the hind edge of the wings. So short is it that the extended feet stick out perceptibly beyond its tip. It is a southern bird and is found only in the extreme southern part of our state.

ACCIPITERS: ACCIPITRINAE.

These are the commonly known Blue-tailed or Woods Hawks. They are long tailed hawks with short, rounded wings; woodland birds that do not often soar about high in the air as do the Buteos, which we will take up later. The Goshawk is not properly an Accipiter but it does belong to this sub-family.

COOPER'S HAWK: Accipiter Cooperi

A short winged, long tailed hawk, not quite so large as a crow, keeps to the woods and does not habitually soar high in the open. Can be known from the Sharp-shinned by its rounded tail and from the Goshawk by its much smaller size.

SHARP SHINNED HAWK: Accipiter velox

A small hawk with a long tail and short, rounded wings. Size near that of a Sparrow Hawk and the Pigeon Hawk, but those two species have long, pointed wings. Large females are often nearly the size of small male Cooper's. The two are almost identical in pattern but generally the Cooper's has a rounded tail and the Sharp-shin a square-tipped tail (slightly forked when folded).

BUTEOS, or BUZZARD HAWKS: BUTEONINAE. (in part)

Not nearly all of the species of broad winged hawks occur in the eastern part of the United States. For the purposes of any one living in Indiana, the following will suffice. They are large hawks with broad wings and broad, rounded tails which habitually soar in wide circles, high in the air. Black or melanistic phases often occur in birds of this group, especially in the Rough-legged hawk. There is considerable variation in individuals within most of the species. This may cause a little confusion among beginners. Young birds are similar to the adults, but are more or less streaked lengthwise below.

RED-TAILED HAWK: Buteo borealis borealis.

Most people identify this large broad-winged, round-tailed Hawk by waiting until its upper side becomes visible. If the tail is not rufous-red, he is then assured that the hawk must be a Red-shoulder, but here he is often mistaken, for young Red-shouldered hawks do not have red tails. From beneath, however, adults have light tails with little or no apparent banding. The under parts of the Red-tailed hawk are more or less zoned, that is, a broad band of dark streakings crosses the under parts midway. The Red-shouldered hawk is uniformly colored below. With a good deal of practice one can easily identify the various Buteos by shape alone. The Red-tail is heavier, with wider wings and a shorter tail than the Red-shoulder.

RED-SHOULDERED HAWK. Buteo lineatus lineatus.

A common large Buteo, often seen circling on motionless wings high in the blue. Recognized as a Buteo by the ample tail and broad wings; distinguished from the Red-tail, which is chunkier, wider-winged, and shorter-tailed, by the banding across the under surface of the tail. The Broad-wing has a banded tail, too, but the bands are fewer and the white bands are as wide as the black. An infallible mark, shared by none of the others, is the light colored spot toward the tip of the wings at the base of the primaries. Nine times out of ten the diagnostic red shoulders of the adults are not visible; but close at hand, in good light, they are quite evident. The

call of the Red-shoulder is a piercing kee-you. The Red-tail's cry is more like a squeal.

BROAD-WINGED HAWK. Buteo platypterus platypterus.

A rather small chunky Buteo, about the size of a Crow. The manner of banding on the tail is the best mark---the white bands are about as wide as the black.

AMERICAN ROUGH-LEGGED HAWK. Buteo lagopus s. johannis.

A Buteo by shape, but larger, with longer wings and a longer, more rounded tail than any of the others. As it often flies low in open country, it might easily be taken for a Marsh Hawk, especially because of the white base of the tail, but the Marsh Hawk is a slender bird, with a slim tail and long, slim wings. The Rough-leg is the only Buteo that habitually hovers, Kingfisher like, or, like an Osprey, in one spot. The normal, or light phase, from below, is distinguished by the well-defined black belly and the conspicuous black patch at the wrist of the wing. Light-bellied birds sometimes are seen. A black phase is quite common; all of these may readily be recognized by the striking under wing pattern, with the large black patch at the wrist-joint.

EAGLES: BUTEONINAE (in part)

Eagles are at once recognizable from the other Buteos, which they somewhat resemble by their immense size and proportionately longer wings. The powerful bill of an Eagle is nearly as long as the head, a point of distinct difference from the lesser hawks.

GOLDEN EAGLE: Aquila chrysaetos canadensis.

The Golden Eagle is a rare sight in the east, but undoubtedly they occur more often than they are reported for most bird students and observers are a bit hazy as to what to look for. The adult resembles the immature Bald Eagle. It may be evenly black below, or it may show white at the base of the tail. When the bird wheels, showing the upper surface, the white tail, with its contrasting dark terminal band, identifies it. The amount of white varies. A young Bald Eagle going into adult plumage may have a tail that is whitish at the base, but never with a contrasting dark band. The wings are slightly shorter and wider, and the tail more ample than in the case of the Bald Eagle.

BALD EAGLE. Haliaeetus leucocephalus.

This, the typical eagle of the East, needs little description. The adult, with its great size and snowy white head and tail, resembles no other bird of prey.

HARRIERS: CIRCINAE

MARSH HAWK: Circus hudsonius

The white rump-patch is the badge of this species. Adult males are pale gray; females, brown. In ordinary flight the bird glides low over meadows and marshes with the wings held perceptibly above the horizontal, and in a manner suggestive of the Vultures. The white rump is always conspicuous. The Rough-leg has white at the base of the tail, but that bird is so heavily proportioned that it could hardly be confused with the slim Marsh Hawk. When the bird is flying high in the air, the long tail might suggest a falcon, but the wings are not pointed. An Accipiter would have much shorter wings.

OSPREYS: PANDIONINAE

OSPREY: Pandion haliaetus carolinensis

A large Eagle-like Hawk---blackish above and clear white below; the only really large bird of prey so patterned. The head is decidedly white, suggestive of the Bald Eagle. Flies with a decided kink or crook in its wings. The eagles and the lesser Hawks are all quite straight winged. The habit of hovering and plunging, feet first for fish, is characteristic.

FALCONS: FALCONIDAE

Hawks with long pointed wings and long tails. The wing strokes are rapid; the slim wings are not built for soaring flight like the Buteos.

PIGEON HAWK: Falco columbarius

A small Falcon, hardly larger than a Robin. The male is bluish gray above with broad bands on the tail. The female is browner. The long pointed wings and long tail separate it from the Sharp-shinned Hawk which has short blunt wings. The lack of rufous red on the tail or the upper plumage distinguishes it from the Sparrow Hawk.

SPARROW HAWK: Falco sparverius sparverius

A small falcon, not much larger than a Robin. No other small Hawk has a rufous-red tail.

OWLS: TYTONIDAE AND STRIGIDAE

Owls are nocturnal birds of prey, characterized by a large head, large eyes, facial discs and soft, moth-like, noiseless flight. They seem quite neckless. Some species have conspicuous feathered tufts or horns; others are round-headed, and devoid of such ornamentation.

BARN OWL: Tyto alba pratincola

A long-legged, light-colored Owl with a white heart shaped face.

EASTERN SCREECH OWL: Otus asio naevius

The only small Owl with ear-tufts. There are two color phases: red-brown and gray. The call is a mournful, quavering whinny, or wail, quite unlike the vocal effort of any other species.

GREAT HORNED OWL: Bubo virginianus virginianus

The only large Owl (nearly two feet in length) with tufts or horns. In flight this owl is larger than even our largest Buteo Hawks. The hooting of the Great Horned Owl is deeper and more resonant than that of the Barred Owl and consists of 3, 4 or 6 hoots, not 8.

SNOWY OWL: Nyctea nyctea

A large white owl with a round head. Seldom found in Indiana. Sometimes young Owls of other species which are white or whitish are mistaken for Snowy Owls.

NORTHERN BARRED OWL: Strix varia varia

The Barred Owl is the common large gray-brown ear-less Owl of the woodlands, the Owl with the puffy round head. The large liquid brown eyes (all others except the Barn Owl have yellow eyes) and the manner of the streaking and barring crosswise on the breast and lengthwise on the belly will identify the bird at closer range.

FEEDING HABITS OF HAWKS AND OWLS

Many investigations have been made in order to determine accurately the kinds of food eaten by those Hawks and Owls of various species. In the past, the knowledge gained in this way has been of little value, largely because the findings were made by untrained individuals using unscientific methods. Food samples were not collected the year round and not enough samples were taken to give a true picture. It would be impossible here to go into the food habits of Hawks and Owls in detail. Recent investigations in Ohio have shown that mice and other small mammals constitute about 35.7% of the total food of all Hawks in the state. Poultry and game birds only formed .8%, other birds 16.9%, other vertebrates 7.4%, insects 30.3% and miscellaneous matter 4%. It should be remembered, when inspecting this table, that it has included all of the Hawks from the Sparrow Hawks, which live principally on insects, to the Accipiters which feed largely on birds, and is a quantitative analysis, indicating that Hawks in the aggregate are beneficial.

For purposes of comparison, we are including tables from "The Hawks of North America" by John B. May, and published by the National Association of Audubon Societies. The first is the table showing the results of examinations of stomachs and crops of the Sharp-shinned Hawks. The second table shows the results of examinations of stomachs and crops of the Cooper's Hawk. Table number three shows the results of examinations of the stomachs and crops of the Rough-legged Hawk and table four shows the results of examinations of stomachs and crops of the Marsh Hawk.

Authority	No. Exam.	Mam mals	Poultry or Game	Other Birds	Other Verte- brates	In- sects	Miscel- aneous	Empty
Warren, B.H. 1890	19	2	8	9	0	2	0	0
Fisher, A.K. 1893	159	6	6	99	0	5	0	52
Bailey, B.H. 1918	13	1	0	9	0	0	0	3
Ferguson, A.L. & H.L. 1922	483	16	?	530	0	38	0	?
Sutton, G.M. 1928	113	0	?	62	0	0	0	51
Munro, J.A. 1929	6	0	2	4	0	0	0	0
Miller, W. DeW. mss. 1929	206	1	0	185	0	0	0	?
Luttringer, L.A. Jr. 1930	?	1	0	10	0	0	0	0
Snyder, L.L. in litt 1931	31	1	0	36	0	0	0	0
Totals	1030†	28	16†	844	0	45	0	106†

Authority	No. Exam.	Mam- mals	Poultry or Game	Other Birds	Other Verte- brates	In- sects	Miscel- aneous	Empty
Warren, B.H. 1890	34	5	18	10	1	3	0	?
Fisher, A.K. 1893	133	11	34	52	4	2	0	39
Bailey, B.H. 1918	8	1	0	7	0	0	0	1
Sutton, G.M. 1928	11	1	1	5	0	0	0	4
Munro, J.A. 1929	6	1	3	2	0	0	0	0
Miller, W. deW. mss '29	47	15	6	11	1	0	0	16
Luttringer, L.A. Jr. '30	36	16	7	2	0	0	10	0
Stoddard, H.L. 1931†	9	0	3	5	0	0	0	0
Snyder, L.L. 1932	20	1	3	9	0	0	0	7
Pearson, T.G. 1933-b	118	14	3	43	0	0	0	62
Totals	422	65	78	146	6	5	10	129

Authority	TABLE # 3. Birds of Prey # 8							
	No. Exam.	Mam- mals	Poultry or Game	Other Birds	Other Verte- brates	In- sects	Miscel- laneous	Empty
Henshaw, H.W. 1875	11	11	0	0	0	0	0	0
Aughey, Samuel, 1878	1	1	0	0	1	1	0	0
Warren, B.H. 1890	11	11	0	0	0	0	0	0
Fisher, A.K. 1893	49	45	0	0	1	1	0	4
Nash, C.W. 1898	32	30	0	0	1	1	0	0
Bailey, B.H. 1918	13	7	0	0	1	1	0	5
Dice, L.R. 1920	1	1	0	0	0	0	0	0
Huey, L.M. 1924	1	1	0	0	0	1	0	0
Miller, W.DeW.mss, 1929	3	2	0	0	0	1	0	0
Munro, J.A. 1929	2	2	0	0	0	0	0	0
Luttringer, L.A.Jr. 1930	7	2	1	0	0	0	0	5
Errington, P.L. in litt. 1930	3	3	0	0	0	3	0	0
Brooks, Allan in litt. 1931	8	7	0	0	0	0	0	1
Snyder, L.L. 1932	58	44	0	0	2	3	3	6
Austin, O.L.Jr. 1932	2	2	0	0	0	0	0	0
Bur. Biol. Surv. 1893- 1931	?	52	0	9	2	7	0	?
Totals	202+	221	1	9	8	19	3	21+

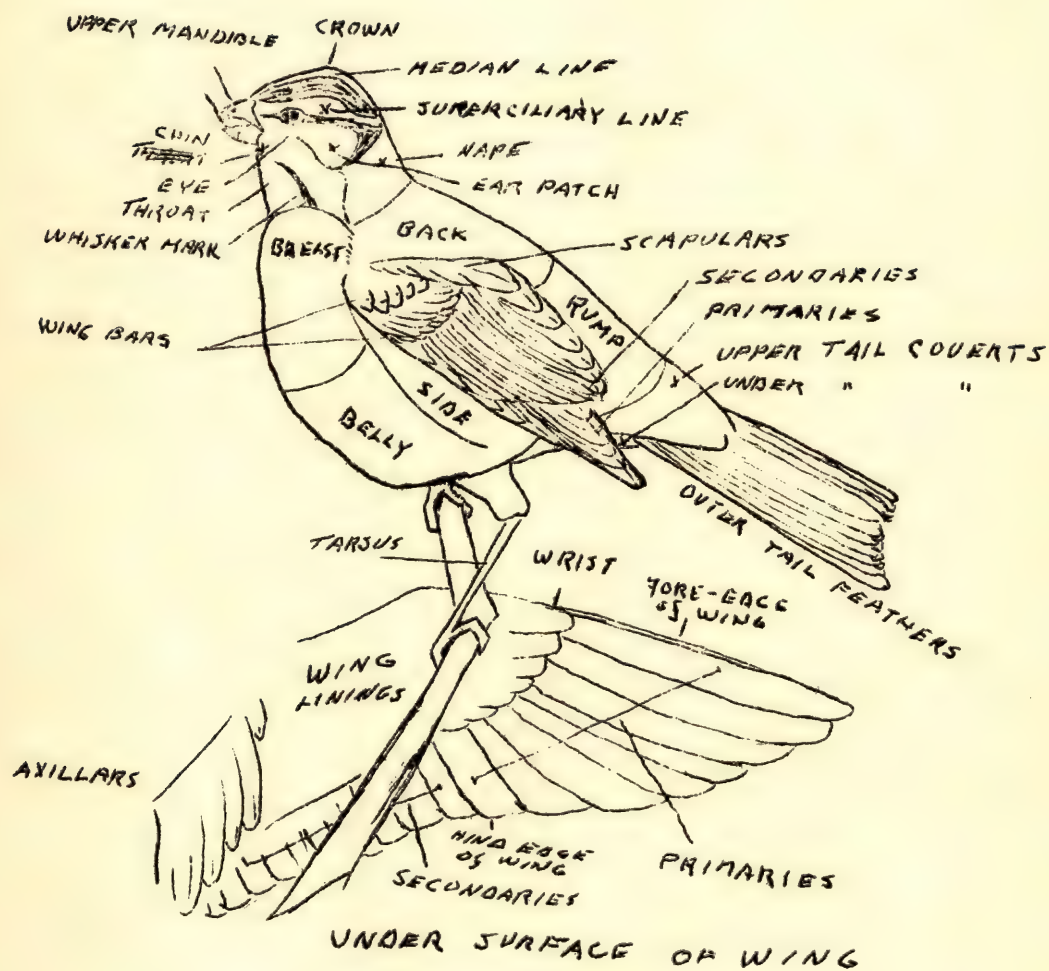
Authority	TABLE # 4							
	No. Exam.	Mam- mals	Poultry or Game	Other Birds	Other Verte- brates	In- sects	Miscel- laneous	Empty
Warren, B.H. 1890	14	8	0	3	3	2	0	0
Fisher, A.K. 1893	124	79	7	34	9	0	1	8
Bailey, B.H. 1918	7	5	1	2	0	1	0	1
Ferguson, A.L. & H.L. 1922	119	52	?	107	14	8	0	0
Miller, W.DeW.mss '29	15	14	0	5	0	0	0	2
Munro, J.A. 1929	3	2	0	1	0	0	0	0
Snyder, L.L. 1932	27	10	2	12	1	0	0	2
Pearson, T.G. 1933-b	109	89	0	12	0	0	0	13
Totals	418	259	10	176	27	11	1	26

It can safely be said that of the Owls in Indiana, only the Great Horned is a species which merits control measures. It is definitely a destroyer of game and poultry and needs to be controlled in areas set aside as game refuges. The other Owls, such as the Barn Owl, the Barred Owl and the Screech Owl may, under certain circumstances, prey to a limited extent upon game and poultry but, under ordinary circumstances, their food consists largely of rodents and insects and they deserve protection.

NOTE: Descriptions of Hawks and Owls were taken almost verbatim from R. T. Peterson's Field Guide to the Birds.

BIBLIOGRAPHY:

- Chapman: "Handbook of Birds of Eastern North America."
 May: "The Hawks of North America."
 Forbush: "Birds of Massachusetts and Other New England States."
 Peterson: "A Field Guide to the Birds."
 Roberts: "Birds of Minnesota."
 Leopold: "Game Management."
 Stoddard: "The Bob-white Quail."



Topography of a Bird

SHOWING TERMS COMMONLY USED IN DESCRIPTIONS

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

SONG AND INSECTIVOROUS BIRDS.

1.

Before beginning a discussion of our more common song birds, it will be well to discuss the adaptations which all birds have for their particular mode of living, for birds occupy a very unique niche in the realm of the out-of-doors, they alone having the power of sustained flight. For centuries men have looked upon the birds with a great amount of awe and it has not been until recent times that we have been able to emulate their powers of flight to even a small degree.

Just how long birds have been on this earth is something about which people know very little. It is probable that they had their origin in some of the prehistoric reptiles which had the power of flight. The ancient Pterodactyls had many similarities with birds of today, with the one outstanding exception that they did not possess feathers. We do know that in their anatomical structure, reptiles and birds are very much alike. But, as the centuries have gone down, there have been outstanding changes. In an early form of bird found as a fossil in a deposit of slate, in Bavaria, one can distinctly see teeth embedded in sockets, forelimbs with three clawed digits and a lizard-like tail with large feathers on either side. This creature, Archaeopteryx, had bird-like characteristics which predominate over the reptilian features so that this curious animal is placed in the class Aves, or birds, although it is but a connecting link between birds and reptiles. There have been approximately fifteen species of true birds found as fossils in deposits in this country. Some of them were large, possessed teeth set in a groove, had strong, wide limbs, with webbed feet and were doubtless flightless, swimming and diving birds which lived upon fishes and other aquatic animals. The others had well developed wings but also probably fed upon fish.

From these pre-historic species have originated our birds of today. There are some 14,000 species of them in the world. They range in every known climate, over all the oceans and in every continent. In Indiana over 365 species have been seen and collected. It is easily possible to find during the course of a year's time over 175 different birds in the state.

One can obtain a fairly comprehensive idea of the general characteristics of birds by a study of a common type, such as the Pigeon. As we have said before, the most outstanding adaptation of birds to their aerial habitat lies in their feathers. The feathers provide a large area of supporting surface with the smallest possible weight. An individual feather consists of the scapus or quill; the fin is composed of a series of parallel barbs and each barb bears a fringe of small processes, the barbules, along either side. The barbules on one side of the barb bear hooklets which hold together the adjacent barbs. The whole structure is thus a pliable but, nevertheless, resilient organ, wonderfully adapted for use in flight. Birds shed their feathers, i.e. molt, usually in the fall, and acquire a complete new set. There may be a partial molt in the spring when the bird assumes its breeding plumage.

The skeletal system of birds is marked by the presence of thin, hollow bones, free caudal vertebrae, which allow movements of the tail, and the keel, which is the foundation for the heavy wing muscles. The fore-limb, or the wings, of the birds are greatly modified so as to provide a strong, supporting structure for the powerful flight feathers.

The muscles of the neck, legs, wings, feet and tails are especially well developed. The pectoral muscles, which produce the down-ward stroke of the wings are the largest. They constitute what is properly known as the breast of the bird.

Pigeons feed principally upon vegetable food such as seeds and, consequently, their digestive apparatus is somewhat different from birds which feed upon animal matter. The mouth cavity opens into the esophagus which enlarges into a crop, where the food is macerated. The stomach consists of two parts, an anterior proventriculus, the thick glandular walls of which secrete the gastric juices, and the thick muscular gizzard which grinds up the food with the aid of very small pebbles, swallowed by the bird. The intestine consists of the duodenum which leads into the coiled small intestine, or ileum, and finally passes into the rectum at a point where two blind pouches, the caeca are situated. The alimentary canal leads into the cloaca, into which the urinary and genital ducts also open. The cloaca opens into the outside by means of the anus.

The circulatory system of the birds resembles closely that of other warm blooded animals. It is more highly developed than that of reptiles or any of the lower animals but lacks some of the features found in the higher groups.

The respiratory system of birds is quite remarkable. There are two lungs which are assisted by a set of air-sacs. During inspiration, air enters the mouth through the nostrils, goes down through the glottis, into the trachea, or feed pipe, which divides, sending a branch to each lung. In Pigeons, the bronchi connects with nine large thin-walled air-sacs, which lie principally along the sides and dorsal surfaces of the body cavity. The air-sacs enable the bird to breathe easily when in flight, since air is forced into them during the rapid progress through the atmosphere and out of them by the compression of the pectoral muscles, which lower the wings. In man, violent movements interfere with the alternate inspirations and expirations of air. The trachea is held apart by partially ossified cartilaginous rings. Where the trachea divides into the two bronchi, it enlarges to form the vocal organ or syrinx, a structure peculiar to birds. Extending forward from the junction of the two bronchi, a flexible valve which is vibrated when air is forceably expelled from the lungs, thus producing a sound.

The excretory system consists of the kidneys situated below the rump. Each discharges its secretions, the urine, through a duct, the ureter, into the cloaca. There is no urinary bladder, but the urine passes directly out of the anus with the faeces.

In the male, the reproductive system consists of the two testes connected with the cloaca by two ducts, the vasa deferens. When copulation takes place, the spermatozoa are discharged into

Song and Insectivorous Birds # 3.

the cloaca and transferred by contact to the cloaca of the female. There is no copulatory organ. Although there are two ovaries in the female birds when young, the right ovary disappears during development. The ova break out of the ovary and into the oviducts where the albumin is secreted about them. The shell membrane is secreted next and finally the shell is added. Fertilization takes place about 41 hours before the eggs are laid.

The nervous system closely resembles the nervous systems of other birds. The cerebellum and optic lobes are large, indicating well developed powers of co-ordination and sight. The olfactory lobes are very small, indicating a poorly developed sense of smell.

In addition to the general characteristics of birds which we have just gone over, the different species themselves have peculiar adaptations which are worth mentioning. This is particularly so when considering the song and form of birds. Their bodies have become adapted to various environments. This adaptation is best shown by wings, tails, feet and bills.

Wings of most birds are used as organs of flight. Birds like the Swallow, Gulls and Albatrosses have long, wide soaring wings. Birds, such as the Bob-white, and song Sparrows possess short, rounded wings which enable them to fly rapidly for short distances. Penguins spend most of their lives in the water and possess wings but are unable to fly. The wings are used as a means of locomotion in swimming under water and the legs are used as a rudder. Ostriches, Rheas, Emus and Kiwis are entirely flightless, although they possess the remnants of wings. Wings may also serve as organs of offense and defense or as musical instruments.

Tails are ordinarily used as an aerial rudder during flight. While perched, the tail acts as a ballancer. Birds that cling to the sides of trees, like the Woodpeckers, brace themselves by means of their tail.

The feet are used for a number of purposes, including locomotion, obtaining food, building nests and for offensive and defensive purposes. Ground dwelling birds have running feet, or scratching feet. Perching birds have grasping feet. Aerial birds have very weak feet. Swimming and wading birds have their toes more or less lobed. Birds of prey possess strong feet with sharp claws for capturing other animals. Woodpeckers have feet adapted to clinging to the bark of trees. The most important function of bills is to procure food. Seed eaters possess short, strong conical bills for crushing seeds; birds that eat insects have longer and weaker bills; birds of prey have strong, curved beaks fitted for tearing flesh. The Pelicans, and Skimmers, scoop up fish and other animals from the water. The bill of the Woodpecker serves as a chisel and that of the Woodcock as a probe for capturing small animals in the muddy shores of ponds and streams.

Birds are among the most beautiful colored of all animals. The color is due to pigments within the feathers, or to structural peculiarities. Males are frequently more brightly colored than females and the young has different plumage than the adult. Color is often of great protective value to the bird. Bird songs, as we have said, are produced by air passing through the syrinx. Call notes should be distinguished from songs. They are uttered throughout the year; whereas songs are usually heard only during breeding season and generally limited to the males.

The bodies of flying birds represent the height of aerial dynamic design. Their bodies are stream-lined, their centers of gravity are low, the bones are hollow and the body contains air-sacs which decrease the specific gravity. In addition to this, their body temperatures range from 4 to 8 degrees higher than the normal body temperatures of man. The rate of speed at which they fly varies considerably. The Carrier Pigeons maintain an average of 35 miles an hour. The record for Ducks is about 90 miles an hour and Swifts have been known to attain speeds of over 200 miles an hour. During long flights the distances traveled per day are comparatively short. Usually not more than 25 miles for small birds and not more than 250 miles for long flying species.

A study of bird migration reveals one of the most baffling of any of nature's mysteries. Centuries ago, birds were supposed to hibernate in the mud at the bottoms of lakes and ponds. As the years have gone by, much has been learned of the journeys which birds make. The studies have been carried on in connection with bird banding which, in this country, is conducted by the Bureau of Biological Survey. Ordinarily migration indicates a journey from the north to the south in the fall of the year and from the south to the north in the spring. Not all birds migrate; not all birds migrate to the same places; not all birds migrate at the same time. They do not go to exactly the same places from year to year and nobody knows exactly why they go at all. It is true that the low temperatures of the winter in the north would be fatal to most birds, and it is true that the amount of food in the north in the winter is much smaller than the minimum requisite. But there are some species of birds which do migrate in just the opposite direction from our most common birds. It may be that the migration phenomenon is a result of instinct. It might be that it is a case of birds following one accepted leader; and as far as that goes, even sun spots have been blamed for bird migrations. The Arctic Tern makes a migratory flight of over 22,000 miles each year. The Golden Plover, which spends some time in April in Indiana, has a migratory journey of over 8,000 miles a year.

Some birds like the Hawks and Owls and the Canada Geese mate for life, but the majority of them live together for a single season only. The nesting season varies according to the species. The Prairie Horned Lark often lays its eggs when snow is on the ground. Most birds wait until later, when the supply of insects is sufficient to feed the young. The nest site is chosen from the standpoint of protection. Usually the nests are concealed; or are built in inaccessible places. Many birds, such as the Auk and Whip-poor-will will make no pretense in nest building but lay their eggs on the ground. There are all stages of complexity between this simple procedure and the woven, hanging, basket nests of the Baltimore Oriole. Some birds not only do not build nests but also refuse to incubate their eggs and care for their offspring. This is true of the European Cookoo and the American Cowbird. The eggs of birds vary in size, color and number. The smallest eggs in existence are of certain humming birds measuring less than

half an inch long. The largest eggs are those of extinct Elephant birds of Madagascar which measured over 13 inches in length, 9 inches in width and had a capacity of 2 gallons.

The values of birds are several. Without taking into consideration the millions of dollars annually derived from poultry products in this country, we may say that their principal values are as food, feathers, fertilizer, recreation from the standpoint of hunters, natural controls of obnoxious weeds and insects, and the esthetic values attributed to the presence of our varieties of song birds. Under most circumstances, birds are extremely beneficial to mankind and their presence in numbers should be encouraged at all times. This is especially true of game and song birds. In a few remote cases, birds must be controlled but it is safe to say that they are among our most useful and most highly prized wild animals.

Inasmuch as all domesticated forms of birds originated from some wild species, it is interesting to know something of the primitive background in this connection. The common hen, in all of its multitude of varieties, was probably derived from the Red Jungle fowl, (*Gallus gallus*) of northeastern and central India. Domestic Pigeons are descendants of the wild Blue Rock Pigeon, (*Columba livia*) which ranges from Europe through the Mediterranean countries, to central Asia and China. Of less importance are the Geese, Ducks, Turkeys, Peacocks and Guinea fowls. Geese are supposed to be derived from the Graylag Goose (*Anser anser*) which, at the present time, nests in the northern British Isles. Domesticated Ducks come from the Mallard (*Anas platyrhynchos*). The Guinea fowl is a native of West Africa. The Turkey has been brought under control in the past four centuries. It was introduced into Europe in the 16th century and soon became a valuable domestic animal. Our domestic Turkeys are descendants of the Mexican wild Turkey.

The so-called song and insectivorous birds fall largely in four orders: The Charadriiformes. These are Plover-like birds including true Plovers, Snipes, Curlews, Gulls, Terns, Auks and Pigeons; Cuculiformes, Cuckoo-like birds. This group includes Cuckoos, Cockatoos, and parrots. The third order, Coraciiformes, consists of the Roller-like birds, including the Rollers, Kingfishers, Owls, Goatsuckers, Hummingbirds, Swifts and Woodpeckers; and the fourth order, Passeriformes, is the largest one, made up of Sparrow-like birds, to which more than half of all the known birds belong. There are 25 North American families of which the following are the most common:

Goatsuckers: Caprimulgidae
Swifts: Micropodidae
Hummingbirds: Trochilidae
Kingfishers: Alcedinidae
Woodpeckers: Picidae
Flycatchers: Tyrannidae
Larks: Alaudidae
Swallows: Hirundinidae
Crows and Jays: Corvidae
Titmice: Paridae
Nuthatches: Sittidae

Creepers: Certhidae
Wrens: Troglodytidae
Thrashers, Mockingbirds, Etc.: Mimidae
Thrushes, Robins, Bluebirds, Etc.: Turidae
Kinglets and Gnatcatchers: Sylviidae
Waxwings: Bombycillidae
Shrikes: Laniidae
Starlings: Sturnidae
Vireos: Vireonidae
Wood Warblers: Compothlypidae
Weaver Finches: Ploceidae
Meadowlarks, Blackbirds, and Orioles: Icteridae
Tanagers: Thraupidae
Grosbeaks, Finches, Sparrows, and Buntings: Fringillidae

One could properly include a discussion of the methods of identification of these commoner families but it is necessary, because of lack of space, to refer the student to books on birds for a detailed description of the birds included in this order. Almost half, about 7,000 species and sub-species of all the birds known belong to this order. Passerine birds are usually small or medium sized but are the most highly organized of the class, Aves. Their feet are four toed and adapted for grasping. Practically all of our so-called song and insectivorous birds belong in this group.

BIBLIOGRAPHY:

Chapman: "Handbook of Birds of Eastern North America."
Forbush: "Birds of Massachusetts and other New England States"
in three volumes;
Peterson: "A Field Guide to the Birds."
Roberts: "Birds of Minnesota."
Pearson: "Birds of North America."

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

Importance of Fur Bearing Animals

Furs have played a very important role in man's existence since prehistoric days when they were used for both clothing and shelter. As civilization developed and advanced furs were used mostly for clothing and adornment as they are today.

The story of the trapping and barter of fur pelts marks the beginning of the white man's occupation of America, and was the real foundation for mercantile and commercial enterprise in the New World. Huge fur trading companies were formed and fur trading posts established throughout the land, vying with each other in the conquest for territory and for new and better trapping grounds.

Since that period great changes have taken place. Nature, in her most generous mood, blessed primeval North America with a wonderful and almost unbelievable supply of wildlife. Then came the railroads, making the wilderness sections of this great hunting ground easily accessible to the trapper and to the settler whose livelihood depended largely upon his ability to hunt game and trap fur.

The entire world had learned of this great country with its broad acres and fine pelts and people came from all over the world to seek a new and better existence in this land of opportunity.

With the advance of civilization and the conversion of this great hunting territory into farming communities has come a continual and pronounced decline in the production of furs. This decline is due more to a limiting of the natural habitat or suitable environment for fur bearers than to the continual trapping and killing of them.

Furs and fur bearers have been recognized through the years as one of our most valuable natural resources. To protect this resource the several states have enacted laws, but very little has been done by any of the states to improve the natural habitat and to help restore and replenish our rapidly diminishing supply.

Fortunately, the muskrat, skunk, raccoon, opossum, fox, weasel, coyote, and mink are able to maintain themselves in thickly populated areas as is proven by the large quantities of pelts handled each year by the raw fur trade.

Natural foods are plentiful in the habitat of these animals and most of them are naturally prolific. The muskrat is usually protected by ice a part of the year. The skunk hibernates in a snug den during the winter months. The raccoon also has the ability to hibernate during periods of low temperatures, and the opossum is a very adaptable animal. The fox and coyote are

Importance of Fur Bearing Animals - 2

cunning and quick and the weasel and mink can slip into any den or burrow and help themselves to fresh meat whenever they choose.

Trapping is primarily a commercial industry in Indiana, and is so considered by the Department as it is by the Federal government and the other states.

In the year 1934-35 more than \$755,000.00 worth of raw fur was sold by the 650 fur dealers of Indiana. To give you specific information there was sold a total of 8,500 skunks, 28,000 opossum, 46,000 muskrats, 2,700 weasels, 28,000 raccoon, 22,000 mink, 7,000 foxes, and 7 badgers. It is interesting to note that the number of opossum and raccoon is the same and that the mink is near the same.

It is our aim and our job to conserve a breeding supply of these wild fur-bearers. We can help to increase the breeding supply by encouraging the landowners to improve the habitat thus increasing the natural wild supply, and by the release of animals that have been artificially propagated or otherwise procured. You can encourage the farmer to leave den-trees stand as long as they will. (The raccoon, under the law, is safe in his den, but this means little to the unscrupulous hunter, who should not be spared for this violation.) You should point out that the ground hog or woodchuck is our chief burrowing animal, and that he makes the holes and the homes where so many of our small animals find shelter and protection from their enemies.

Urge the farmer to let his little waste land spots grow up in brush and weeds, and do the things that will make it easier for the small game and animals to survive and multiply.

It is the duty of trappers to cooperate with all conservationists in helping to perpetuate the supply. "Conserve your occupation" should be the slogan of every trapper.

Mr. Frank G. Ashbrook, who has charge of the Fur Resources, Division of Wildlife Research in the Bureau of Biological Survey, estimates that the fur resources of this country yield the trapper annually \$65,000,000.00, and that a large part of this income goes directly to the farmer or the farm-boy trapper. Most of your work, that can and will bring good results, must and should be done with the landowner. Some of the waste places, or the marshy areas, if properly utilized for wildlife purposes could very easily produce more furs in dollars and cents than could be done with any other crop.

With the annual decline in wild fur has come an increase in the number of fur animals raised artificially or in captivity, chief of which is the silver fox. We have several silver fox farms in the north east section of this state. The pelts produced in Indiana compare favorably with those produced in other sections of the country. The time may come when the fur industry shall have to depend almost entirely upon animals

Importance of Fur Bearing Animals - 3 .

raised in captivity unless we can arouse people to the need for action and help in conserving our fur-bearers.

Statistics and research prove that wild fur-bearers go through definite cycles of abundance and scarcity. These cycles are partly due to disease epidemics among the animals and partly to the supply of small animals and bird life constituting the chief source of food for fur-bearers. The small animals also go through life cycles because of the inroads of infectious diseases.

The modern tendency and indeed the advice of scientists who are making life studies of the factors responsible for the fluctuations in wild animal life, is to provide for a more liberal "take" of wild fur bearers during periods of peak population and restrict the taking during periods of scarcity.

This is good business and in line with the modern conception of true conservation--protection, propagation, and a wise utilization of the surplus. Don't trap when furs are unprime. Leave a breeding stock nucleus. Obey your conservation laws.

Every warden should know how to handle and care for our native Hoosier furs. More detailed information on this subject can be found in a book - "Guide for Trapping" - here in the Library. You will have confiscated furs that if properly cared for will be more valuable to the Department.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

GAME AND FUR-BEARING ANIMALS IN INDIANA

Indiana has two groups of animals, protected by law, and classified as game animals and fur-bearing animals. In the first group are rabbit, squirrel and deer. Fox, opossum, raccoon, skunk, mink, muskrat and beaver comprise the second group. Indiana's recodified fish and game laws of 1937 class all of the above as upland game animals.

All of these are known as mammals, a name which is derived from the method of feeding the young at the breasts or mammae.

Of the three game animals, hunting of rabbits and squirrels is permitted while deer are protected at this time in Indiana. Rabbit hunters constitute the greatest number of license buyers in this state and probably the rabbit furnishes more sport and food to a greater number of people than any other game or fur-bearing animal or game bird, due to their numbers and wild distribution in every county in Indiana. Squirrels also are widely distributed and provide an abundance of hunting. Deer were once plentiful in Indiana, but have long been extinct or at least nearly so until in recent years the Department of Conservation has been stocking this game animal in several southern counties. Reports indicate that these deer are establishing themselves and increases are being noted.

Of the fur-bearing animals, hunting and trapping of all are permitted by seasons excepting the beaver, which is protected, also the 1937 recodified laws removes protection to the gray fox and on the red fox until January 16, 1939. Fur-bearing animals provide much revenue to Hoosier hunters and trappers with annual sales amounting to over three-quarters of a million dollars. Muskrats lead these sales followed in order by the mink, raccoon, opossum, skunk and foxes. Muskrats also lead in number of pelts caught, followed by opossums, skunks, raccoon, mink and foxes.

Beaver have long been extinct in Indiana, but have been introduced in recent years in northern counties where they are thriving and increasing.

Further information follows on non-game or fur-bearing animals in Indiana that are inhabitants of this state but are not protected. These include the badger and coyote.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

SKUNK

Range

The common or striped skunk, which is also known as a pole-cat or wood pussy, is distributed throughout North America. They are common in all parts of Indiana, ranging in both open and wooded areas as well as hilly and low lands.

Habits

Skunks have only one efficient protection against common enemies, this being their ability to secrete a penetrating fluid of disagreeable odor for a distance of ten to twelve feet from anal glands. With this, a skunk merely turns his back to an enemy and seldom attempts to escape by running. The anal glands are in no way connected with the urinary tract. The fluid is ejected by muscular contraction in fine jets from two tubes connected with the scent sacs on each side of the vent. These scent glands can be removed by a surgical operation and skunks that are used in display at Indiana game farms have had these sacs removed. Skunks are bold in their ventures, often appearing in farm lots and around farm buildings. Probably this fact is induced by their food habits. They are nocturnal in habit, spending most of daylight hours in dens, being active at night and late evening.

It is often said that the operation of skunk scent glands can be prevented by holding the animal by the tail. This is not a fact as a skunk can still eject this fluid in that position. Two methods appear feasible for such prevention and they are by drowning or by severing the spinal cord by shooting.

Skunks become very fat in the fall and den up for long periods in severe weather.

Breeding

The gestation period is 63 days. From two to ten young, with an average of five, are born during April and May in dens prepared by the female in abandoned woodchuck holes, hollow logs or stumps, rock piles or under farm buildings. Nests are lined with dry leaves and grass.

Food

Foods consist of rats, mice, almost any insect, fruits, berries, eggs, game birds and poultry if the latter two can be caught. Skunks do considerable shallow digging in obtaining some of their foods.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

MUSKRAT

Range

Muskrats get their name from a musky odor given off by a pair of perineal glands. They are found in most parts of the United States where lakes, marshes, rivers and creeks are found, and constitute the greatest number of fur-bearing animals that are pelted in Indiana.

Habits

They are always found in and around water, with some exception when they migrate to new territory or in search of food. Muskrats are very good swimmers, spending a great portion of the time, both winter and summer, in water, and for this reason they develop a very heavy fur, particularly an undercoat and when guard-hairs are removed, the fur resembles that of fur seal. The name Hudson seal is given to muskrat fur, which is made up by furriers into women's fur coats of popular demand.

Rats are diggers and are a constant menace around earthen dams and levees where they burrow to make dens. Unless care is taken to prevent it, rats are often responsible for starting leaks in levees or dams and causing washouts of sections.

Breeding Data

The gestation period is variously shown by some authorities as from 21 to 27 days, with some doubt as to the exact time. Two and three litters, in size from four to twelve and probably averaging six to eight are born to females in Indiana, while in southern climates as high as five litters are produced by one female in a year. This high rate of reproduction permits the muskrat to hold its own against enemies and heavy trapping. In fact, their numbers have increased in many areas during recent years.

Muskrats construct their dens either in houses built in water from reeds and grasses or in burrows in stream banks or levees. Entrances to either houses or bank dens are always under water while the nests are constructed in those above water-line.

Food

Aquatic vegetation, consisting mostly of roots and tubers, form the greater portion of muskrat's food, although they will occasionally eat grains when these are available. Some few instances have been noted where they eat animal matter such as dead bird or animal flesh and mussels.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

COMMON OPOSSUM

Range

The common opossum is found in eastern, middle-western and southern states, being more abundant in the latter section. They are found in all parts of Indiana and constitute the second largest number of pelts caught in Indiana and reported by fur-buyers.

Habits

Opossums prefer to roam in the vicinity of water and are most numerous in and around swamps, along streams and bordering territory. They are nocturnal in habit and den in hollow trees or logs, in holes under the roots of trees, and in abandoned ground dens. The familiar term, "playing 'possum," is taken from the opossum's habit of dropping limp and apparently lifeless when attacked and this provides its only protection when cornered by enemies.

Breeding Habits

The gestation period is thirteen days. From five up to as high as twenty-two young are born in an embryonic stage, being about the size of a navy bean. Nests are made by the female out of leaves and grasses in dens as shown above. Much has been said about the unnatural method of breeding of opossums, however, there is no foundation for such discussion as they breed in the same manner as other mammals.

Young are also born in a natural manner, but there has been considerable discussion as to the manner in which the young reach the abdominal pouch which all female opossums have. Some authorities state that the embryos are assisted or placed in the pouch by the mother while others state the young travel to the pouch under their own power. This method seems to be the most authoritative. There are only accommodations for eleven or twelve embryos and those in excess of these numbers are left to starve and fall out of the pouch. The young, once in the pouch, attach themselves to a teat to which they remain attached for between 52 to 74 days and are weaned at about 30 days. Females produce one to two litters a year in southern states, but seldom more than one in Indiana.

Foods

Foods consist of most everything edible in vegetable and animal matter. Acorns, chestnuts, beechnuts, berries, tender plants, birds, reptiles, mice, rabbits, rodents and eggs all furnish food for opossums.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

BEAVER

Range and Habits

Beaver once were established over most of North America, being abundant when this country was first settled, but are now extinct excepting through our northern tier of states and in Canada.

The beaver skin has always been a standard for barter and exchange and the demand for their pelts by large fur companies all but exterminated this animal. Conservationists have since given them proper protection and in a few places the beaver is building up its numbers to such an extent that they are common.

In Indiana they have been extinct for probably fifty to seventy years, until the past two years the Department of Conservation has introduced them again in a few northern counties where they seem to be thriving.

The beaver is well-known as a water conservationist as well as a skilled engineer. He is rated as the only North American animal that provides a sure all winter supply of food and these characteristics have provided materials for volumes that have been written about him.

Probably the beaver's best known habit is the building of dams to provide what are generally called beaver ponds. In these ponds they construct houses similar but larger than muskrat houses or make their dens in banks surrounding the pond. Entrances to both the bank dens and houses are always under water level and nests built above water line. Dams and houses are constructed from small trees from two to twelve inches in diameter which are cut down by beaver. Bark from such trees is usually consumed for food while the balance of the tree is cut up and made into a water-tight dam, or house, with mud being used as a plaster. Large food supplies are cut up from felled trees and stored near the entrance to houses or dens during fall months and are available during winter months when the pond freezes over. Trees that are used for such work and food are aspens, willows, poplars, cottonwoods, birch and alder, while vegetable matter such as roots, tubers and grasses are also eaten.

Breeding Data

The gestation period is about three months. Two to six young are born in April and May with one family growing in numbers possibly to eight or ten, forming a colony until the size of the family requires some of the members to move to new territory. A pair of beavers mate for life.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

RACCOON

Range

Raccoon cover most of the United States with several sub-species comprising the group according to localities. The eastern raccoon inhabits all parts of Indiana where it is very popular both as a game and fur-bearing animal.

Habits

Their intelligence probably incites more popular attention than any of the other fur-bearing animals. They prefer the vicinity of streams, lakes and marshes where timber is nearby, as they make their homes in hollow trees or logs. Sometimes they will use burrows in the ground or under rocks but not often. Raccoon are nocturnal in habit, spending daylight and evening hours in their dens. In the fall, they eat in excess to provide extra fat for their winter hibernation, which begins in Indiana often in December and runs through into January and February.

Breeding

The gestation period is sixty-three days. Three to six young are born in April and May, with one litter being produced during the season. Nests out of grasses and leaves are made in dens as shown above.

Food

Fish, crayfish, frogs, turtles, reptiles, insects, rodents and some grains furnish raccoon with most of their food. They also like eggs and will take game birds and animals, but are too slow in action to catch many of these. Ear corn in milk stage is relished by raccoon.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

BADGERS

The range of the badger is through central North America, south from Saskatchewan. They are found in a few northwestern counties in Indiana and have been caught on the Jasper-Pulaski State Game Preserve.

These mammals are expert diggers in almost any kind of soil. They earn their food of ground squirrels, prairie dogs, mice, gophers and small mammals by digging them out. They also eat birds and eggs and sometimes take poultry in outlying districts when a hen or turkey ranges out some distance from farm buildings.

Badgers are excellent fighters and can well protect themselves under normal circumstances from other animals that might attempt to prey upon them.

The exact gestation period with badgers is unknown. However, the young, numbering from one to five, are born in May or June in burrows in the ground.

STATE OF INDIANA .
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

MINK

RANGE AND HABITS

Mink are found in most parts of North America where there is a fresh and permanent supply of water. They are found in all parts of Indiana, but the greatest numbers inhabit the marsh and lake region in the northern part of the state.

This mammal seems to be a combination of the weasel and otter, at least as far as its food habits are concerned. The weasel feeds entirely on land while the otter is an aquatic feeder. The mink has the ability to acquire his food on land and in water.

The mink is considered a killer, particularly if his hunger has not been satisfied and often makes kills far in surplus of food requirements.

They have a more or less regular route to cover in their nocturnal travels and apparently get over these routes every eight or ten days.

BREEDING DATA

The gestation period is 42 days with one litter a year being produced, consisting of four to eight young. Nests are made in ground dens, hollow logs or rock piles.

Food

Foods consist of fish, frogs, reptiles, rats, mice, muskrats, rabbits and birds.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

RED FOX

Range

Red foxes are located in the greater portion of the United States and are or have been present in every county in the state of Indiana.

Habits

Their shrewdness and mental alertness provide them with the capacity to meet most requirements of their surroundings. They are considered pests by many people, but to others they provide an age-old sport of fox chasing with dogs. Indiana has many fox hunters' organizations, most of which are located in the southern half of the state. Red foxes range both night and day, but are principally nocturnal in habit.

Breeding Data

Red foxes pair off and breed usually in February. The gestation period is fifty-one days. Abandoned ground holes are usually cleaned out and enlarged if necessary to provide a nest in which four to nine young are normally born. At least two entrances are nearly always provided in dens to enable escape in case an enemy enters one entrance. Only one brood is produced in a year and these remain in a den about three months before starting to range with their parents. During June and July entrances to dens are dangerously marked with bones and feathers of various animals and birds that have been brought in by either parent for food and this fact usually identifies a fox den.

Foods

The red fox is credited with killing much game and domestic poultry for food and undoubtedly there is much truth to this, yet they also feed on mice, rodents, reptiles, insects, and fruits. One authority gave results of an exhaustive study of the food habits of foxes in two middle western states, covering a five year period and reduced the report to the following proportion: 1 pig, 40 rabbits, 3 ground squirrels, 46 mice, and 10% in wild birds.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

COTTONTAIL RABBIT

Range

The cottontail rabbit is generally distributed over most of the United States and is well-stocked throughout Indiana with greater populations in southern counties.

The Mearns cottontail is the sub-species that is found in central and middle-western states ranging from the Alleghenies west through northern states to Kansas and south into Kentucky and Tennessee.

HABITS

Rabbits are nocturnal in their habits and spend the greater portion of daylight hours in nest-like forms under cover of grasses, brush, hollow trees, straw and hay stacks, old farm buildings and holes in the ground. They are found in both fields and woods and in both light and heavy cover and often are seen in suburban residential sections of cities. Rabbits do not dig burrows of their own, but use holes dug by woodchucks, especially the females, and both sexes will take cover in ground holes during severe weather and in retreating from dogs or hunters. For this reason, woodchucks provide protection for rabbits which is very necessary and beneficial. Females are more accustomed to using heavy cover, brush piles and holes for hiding places while the male rabbit will use more open territory, resulting in a much heavier kill, by hunters and vermin, of bucks than females. This fact must be an important factor preventing a depletion of rabbits in Indiana.

Rabbits are carriers and subjects for tularemia, a disease that is readily transmitted and serious to human beings. Such diseased rabbits are usually listless and peopless in their actions when disturbed by a hunter. The disease is transmitted in skinning and cleaning when safety can best be had by the use of rubber gloves in this operation. Proper cooking of a rabbit with tularemia kills the disease, eliminating any danger.

Breeding Habits

The gestation period is twenty-eight days and one to three litters for an average of four each are usually produced by one female. Breeding starts early in the year, usually in January or February, and extends through to August. Nests are made on top of the ground, sometimes in hay, straw or rubbish stacks, but more often in open territory where shallow pits are dug out and nests are made in them out of dry grasses and leaves with the inside lined with fur from the mother. Tops of nests do not extend but very little, if any, above the ground level.

Rabbits - 2

Food

Rabbits are chiefly vegetarians and relish clovers and tender grasses. Grains are secondary foods but are readily eaten in winter when vegetable matter is scarce, as well as twigs and bark of young trees. Prunings from trees, especially apple trees, can well be used for winter rabbit feed if piled and left instead of being burned as often occurs.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

COYOTES

Coyotes are found in most parts of the United States and Canada and their range includes many northern Indiana counties, but principally in the Kankakee River Valley. Quite a few of these animals are caught and killed each year according to records in counties where bounties are paid.

Their food consists of small rodents, and some game birds and their eggs. They also kill and eat young pigs and lambs, which has caused bounties to be put upon them in several counties.

The gestation period is nine weeks and from five to seven form a normal litter, although one litter with ten was caught on the Jasper-Pulaski Game Preserve, along with the parents. Dens are usually made in hollow logs or in old abandoned ground burrows which are cleaned out and enlarged by the female.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

Gray Fox

Range

Gray foxes are found in most parts of the United States and have occurred in every county in Indiana, yet the heaviest distribution in this state is in southern counties.

Habits

They are not adapted to civilization as well as the red fox and prefer to range in wild, unpopulated territory. The gray fox is an excellent tree climber but has little endurance when being pursued, causing it to seek refuge in dens or trees. For this reason, they are disliked by fox hunters, who prefer the longer chase a red fox provides.

Breeding data and food habits are practically identical with the red fox.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

SQUIRRELS

Range

Gray squirrels are found in most of Indiana, with the greater number inhabiting the south two-thirds of the state. Fox squirrels are usually found in the north one-third of the state, although they live locally south of this.

Both species are found in eastern central, middle western, southern, and southwestern states.

Red squirrels are also found in most parts of Indiana. They are not protected and are considered pests.

Habits

Fox and gray squirrels are found only in wooded areas, since trees furnish their homes. They are very wild but quickly become accustomed to humans when released in public parks. Their ability to hide quickly, when disturbed, on a tree limb or tree trunk probably affords them their best protection against enemies. Their eyesight is very limited, however their sense of hearing compensates for this limitation.

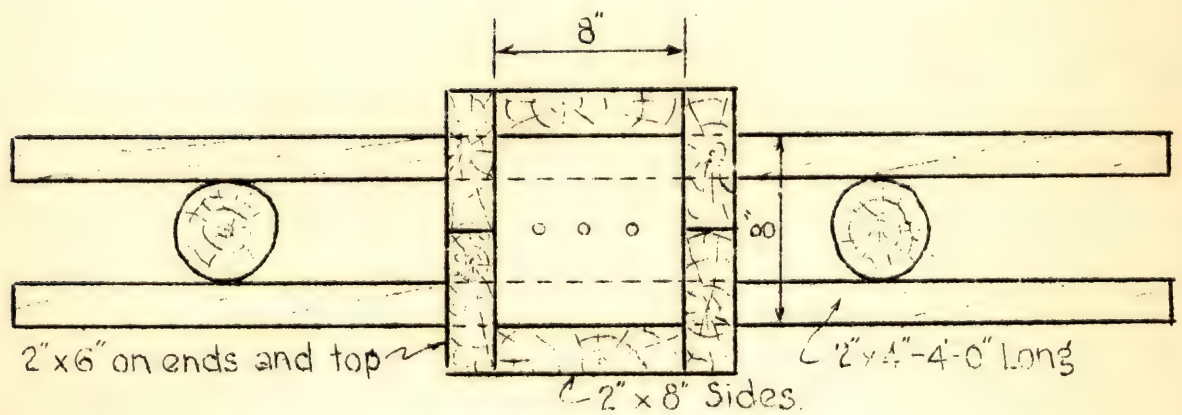
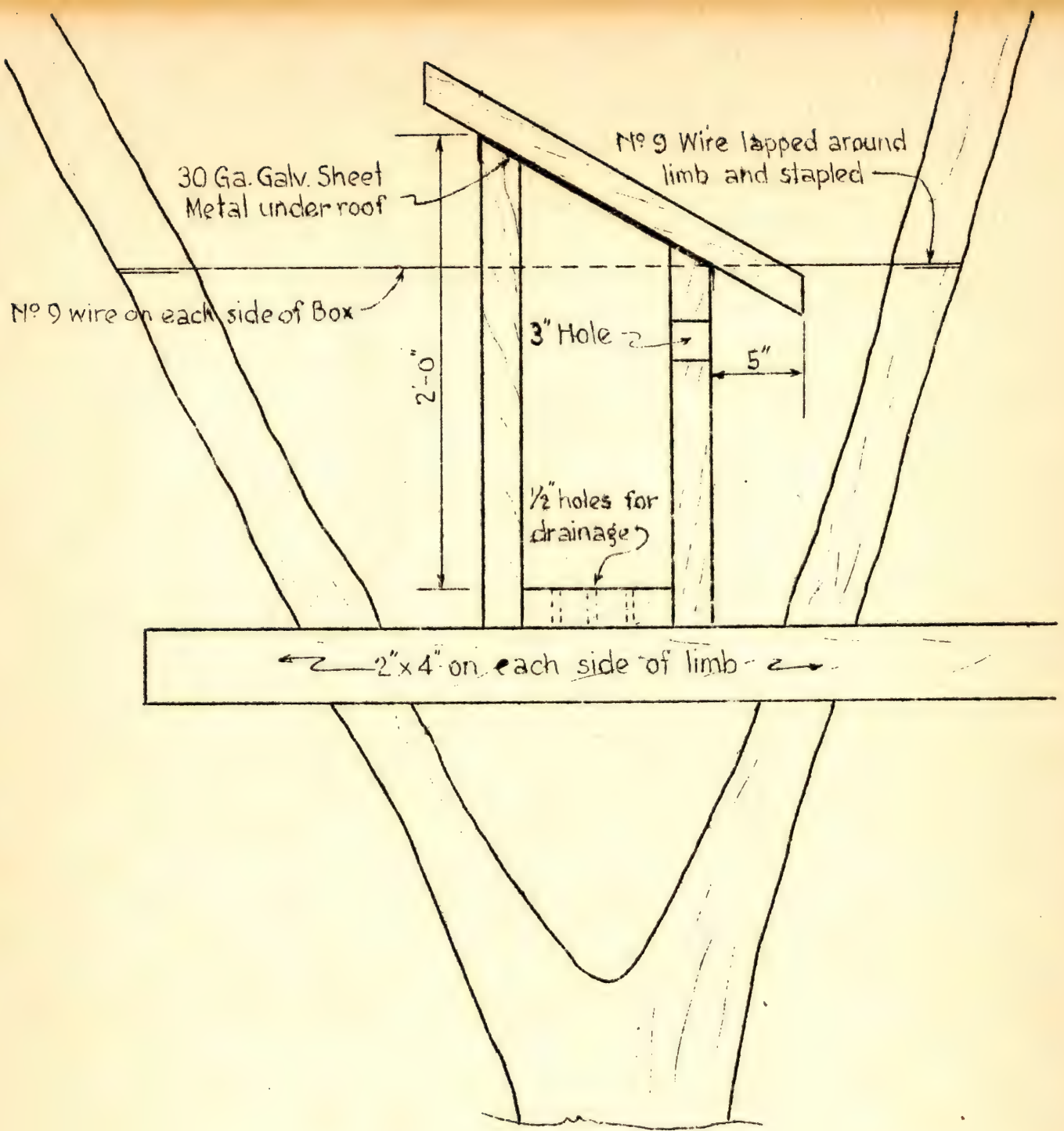
Breeding Habits

The gestation period is forty-five days. Breeding occurs early in the year with young being born in February and March. Litters amount to three, four, or five and the second litter is sometimes produced in the same year.

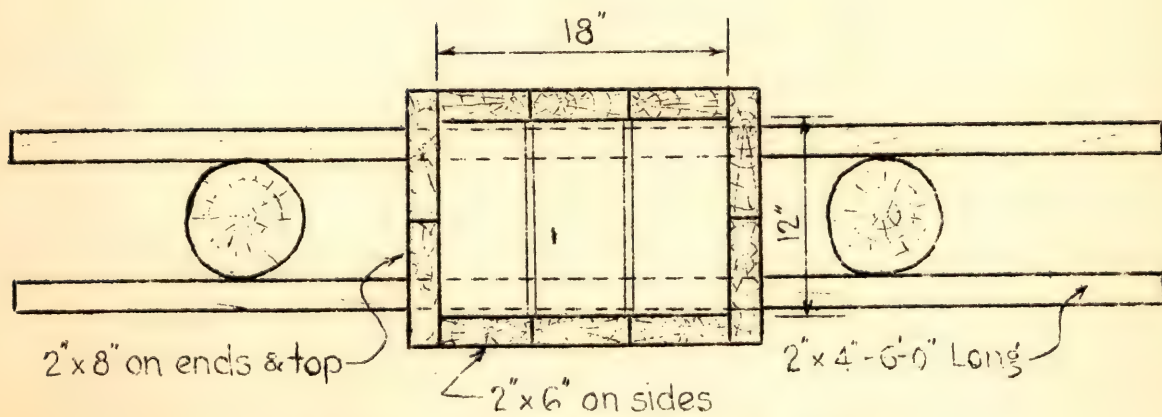
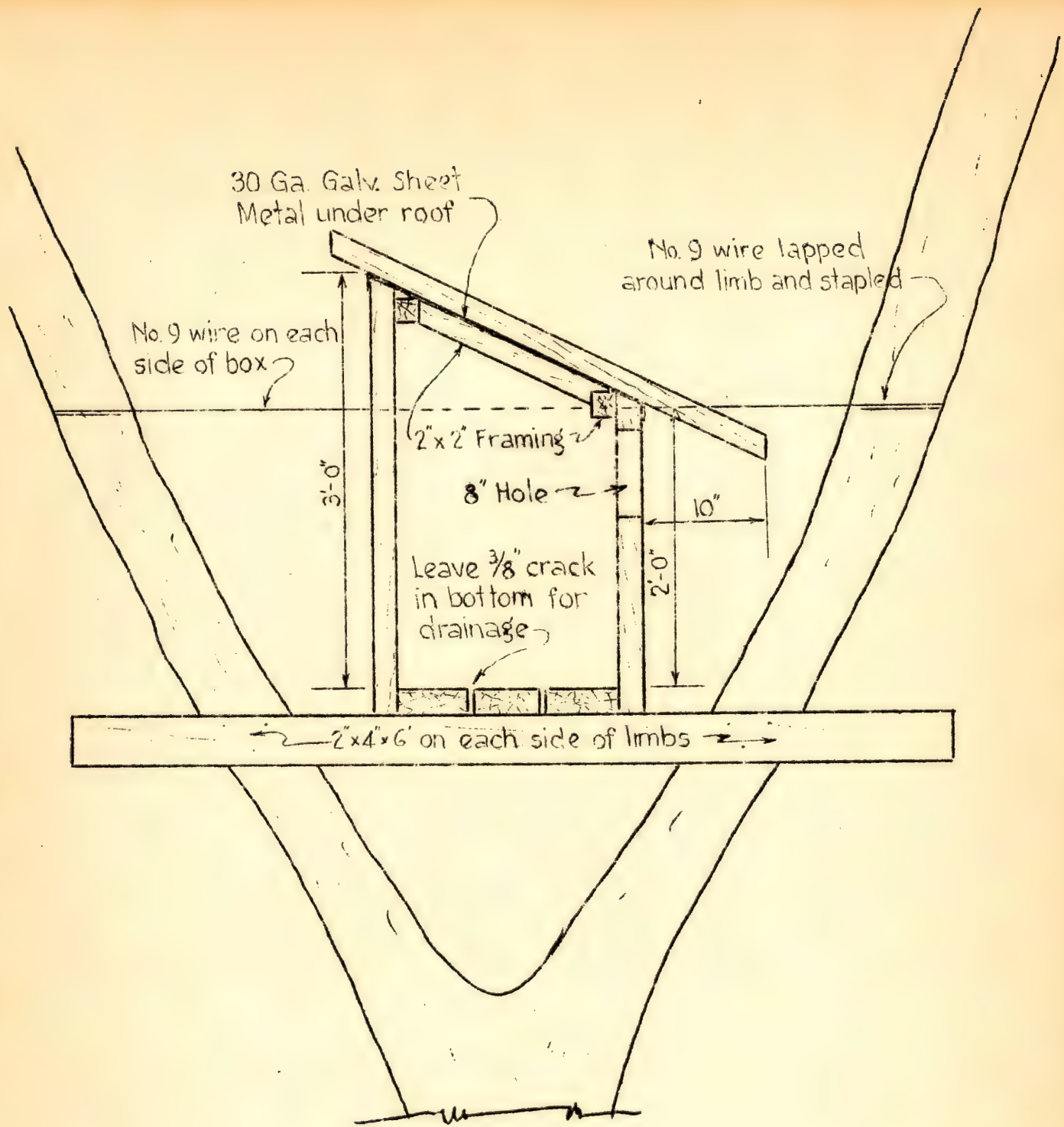
Nests are usually constructed out of twigs and leaves in a tree fork. They are round to oval in shape and often placed in hollow trunks of trees.

Foods

Squirrel food consists chiefly of nuts, including acorns, supplemented by grains, berries, fruits, buds, and roots. During summer and fall months, when nuts and acorns are plentiful, squirrels bury these in the ground at a shallow depth to take care of their winter food supply. Their sense of smell helps them in locating probably an ample supply of this stored food during winter time but many are not found and these germinate and start new trees.



SKETCH FOR SQUIRREL DEN.



SKETCH FOR RACCOON DEN.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

VIRGINIA or WHITE*TAILED DEER

Range and Habits

The White-tailed deer gets his name by throwing up his tail and exposing a vivid white flash at each leap when making a retreat from an enemy or a disturbance.

This game animal is generally distributed throughout the United States and is found in several southern Indiana counties. Reports of deer being seen have also come from central counties.

In northern states, where snow fall is heavy during winter months, deer gather together in large numbers forming yards by keeping the snow trampled to afford feeding and browsing but they are usually found in two's or three's during summer and fall months.

A characteristic of deer is antlers that grow on males and sometimes, but very seldom, on females. The antlers grow but are shed each winter and in the summer a new set is grown.

Breeding Habits

Gestation period is 205 days. One, two, or three young are born, usually in May. The young are of a rusty brown color marked with large white spots.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
GAME WARDENS SCHOOL

GAME AS PROPERTY

- I. Wild Animals Generally - Rights of the State
- II. Rights of Individuals
- III. Nature of Private Rights in Wild Animals
- IV. Property Per Industrium or by Reclamation
Property Ratione Soli
- V. Effect of Escape of Wild Animals

GAME LAWS

- I. Introduction
 - A. Scope of Game Laws
 - B. Property in Game
 - C. Ownership of Game Reduced to Possession
- II. The Right to Hunt
 - A. Dependent on Ownership of Soil
 - B. Right to Shoot Waterfowl
 - C. Acquisition of Hunting Rights in Premises
of Another
 - D. Remedies for Violating Hunting Rights
- III. Validity and Construction of Game Laws
 - A. Power to Enact Laws
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 - D. Forfeiture of Hunting Apparatus
 - E. Application of Statutes to Game Killed
in Another State
 - F. Exportation of Game
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- IV. Particular Regulations
 - A. Closed Season
 - B. Sale or Possession
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 - E. Animals Raised in Captivity
- V. Fish and Fisheries
 - I. Introduction
 - A. Scope of Lecture
 - B. Property in Fish
 - C. Property Ownership of Fish in
Private Waters
 - II. Nature and Kinds of Fisheries
 - A. Different Kinds of Fisheries
 - B. Fishery as Property Right

C. Ownership of Soil

III. Rights to Fish in Public Waters

IV. Regulations of Fishing

GAME AS PROPERTY

I. WILD ANIMALS GENERALLY - RIGHT OF STATE

In England under the old common law, the ownership of wild animals and fish was in the crown. In the United States the ownership of wild animals and fish, not reduced to actual possession by private persons, is in the people of the state in their collective sovereign capacity, or in the state as representing the people of the state. The State of Indiana holds the proprietary title to wild animals and fish within its jurisdiction in trust for the whole body of the people of the state. The ownership of the state is that of a trustee which means, in effect, that title is held for a particular purpose. The State of Indiana has the title and ownership to the wild animals and fish for the purpose of making regulations for the taking and acquisition of property in them. The power to make rules and regulations for the acquisition of game is known as the police power of the State of Indiana which may make regulations and restrictions on the taking and possession of wild animals and fish as the state may see fit for the protection and preservation of its trust.

This right to regulate and control the acquisition and property in wild animals and fish refers only to ferae naturae, or such animals, birds, and fish which are in the wild state. Theoretically, of course, this extends only to such ferae naturae as are within the boundaries of the State of Indiana. In other words, our regulations on the taking, possession, and transportation of rabbits refer to rabbits within the boundaries of the State of Indiana. However, the courts have held that where the game protected is indistinguishable from the same kind of game taken from other states, the statutes restricting the possession of such game apply to all game, regardless of where it is acquired. The reason for this rule is obvious. The object is not to affect the legality of taking game in other states, but to protect local game in the interest of the food supply, sport, and recreation of the people of this state. If such laws applied only to local game, then they could be evaded because of the difficulty in showing that the game which a defendant is charged with having illegally was game taken in the State of Indiana.

Game laws in the State of Indiana apply to the game specified therein, regardless of where it is acquired or originally taken.

II. RIGHTS OF INDIVIDUALS

As a general rule there is not individual right in wild animals or fish so long as they remain wild, unconfined, and in a state of nature. However, wild animals and fish are objects of a qualified ownership upon the happening of certain conditions. Any person in the absence of statutory inhibition may seize them and make them their property. The right to seize and take possession of ferae naturae is a privilege rather than a right. The true theory seems to be that since the state holds title to animals and

fish *ferae naturae* in trust for the people, and the people are the beneficial owners, the individuals making up the state may fish and take private possession and ownership of those animals, but in so doing they are subject to such restrictions and conditions as the state acting for and in behalf of the whole in an exercise of its police power may place on that taking. An individual would have a right to take a rabbit at any time in any manner unless restricted or regulated by statutes. He must, in the event of regulations, take rabbits only in open season, and in a manner and in such numbers as the statute permits. This privilege of taking animals *ferae naturae* may be entirely terminated by such restrictions.

This qualified property that individuals acquire in *ferae naturae* is classified as follows:

Property per industriam which is acquired by a person's own industry or efforts in capturing or retaining them.

Property ratione impotentiae which is acquired because of the special right or privilege of taking them to exclusion of others. This right has never existed in the State of Indiana.

Property Ratione soli which is acquired by reason of ownership of the soil. There is no property in wild animals propter consuetudinem; that is, by reason of the custom of the animal to come on the person's land.

III. NATURE OF PRIVATE RIGHTS IN WILD ANIMALS

Over animals *ferae naturae* which are free and undomesticated, not enclosed or confined, and having within themselves a principle and power of motion which render them capable of conveying themselves from one part of the state to another, man can have no absolute property. For example, a man cannot have absolute property over the rabbit or quail on his farm, nor can he have absolute property over the fish in the stream that runs through his land. However, if there is located on his farm a pond which is not connected with any stream or ditch in such a manner that the fish may escape to the river or stream, then it may be said that the property right of the owner is absolute. The Attorney General has held that the laws of the State of Indiana, concerning the closed season, bag limits, license, and size of fish do not apply to fish in private ponds. The owner may remove them at any time.

Animals and fish *ferae naturae* being captured are subject to the qualified property, but an individual may acquire an absolute property in a dead wild animal unless the taking or capturing was in violation of law. The illegal act of capture has not made the animals subject of absolute property. A practical application of this rule may be seen when an individual has taken, unlawfully, any game bird or animal. He has no property interest in it, and the animal may be taken from him. The same is true where the statute has declared that possession of said game is

unlawful at a particular time. In that case the possessor or any other person does not have the property right because it would be in violation of a law which was enacted for the protection of *ferae naturae*.

IV. PROPERTY PER INDUSTRIAM OR BY RECLAMATION, OR PROPERTY BY RATIONE SOLI

Wild animals or fish acquired through the efforts or industry of an individual may be said to have vested in him a property per industriam, and this property may be gained by taming, domesticating, or confining these animals or fish.

It is also a well settled rule that the owner of land, has exclusive and inherent right by reason of his ownership of the soil to take the wild animals to be found thereon. This right, however, is subject to the state's ownership and title held for the purpose of regulation and the preservation of such *ferae naturae* for public use. The owner has the exclusive right to take and obtain the qualified ownership under all the rules and regulations and restrictions imposed upon the taking and possession by the state. Subject to these statutory limitations, his right is exclusive of all the world. This right of the owner to exercise exclusive dominion over all the wild animals contained within his boundaries extends to all game birds, animals, and fish. This exclusive right to take game or fish upon his own land so far as is not restrained by the state has been held to give the owner a property ratione soli in the game and fish.

There was a recent decision in the Indiana Supreme Court, involving this principle. This case was the case known as Sanders vs. DeRose, originating in Steuben County near Angola. In that case, part of a lake which contained about twenty acres was located on the land of two different persons. The Court held that each owner had an exclusive right to fish in his portion of the lake to the exclusion of all others, including the other owner. The principle involved was the one mentioned above; that is, that the owner of the soil has exclusive right to fish for the fish within the boundaries of his ownership. The owner, of course, must abide by the laws of the State of Indiana regulating seasons, bag limits, and size of fish taken.

V. EFFECT OF ESCAPE OF WILD ANIMALS

This qualified property which an owner has in *ferae naturae* which he has captured and confined is lost if the animal escapes. When a captured animal escapes and returns to nature, all property that the owner once enjoyed is extinguished, and anyone thereafter may seize and take the escaped animals if not so prevented by law.

For example, pheasant chicks which have been raised by a domestic hen are said to be the property of the owner of the hen until they are of age and revert to a state of nature. When the pheasants leave the hen and shift for themselves and are not

confined, the qualified property has terminated.

There is a notable exception to the rule mentioned above, and that is, animals which are said to be animus revertendi or having the intention of returning. An example is the carrier pigeon. Where animals can be said to be animus revertendi, the owner does not lose ownership even though the animals leave their dominion for considerable distances or for considerable lengths of time.

GAME LAWS

I. INTRODUCTION

A. Scope of Game Laws

The purpose of this part of the lecture is to treat the restrictions which government can impose on the right of mankind to kill and possess animals ferac naturae. The animals referred to in this part of the lecture are commonly classified as game, and include not only the four footed mammals, but birds and water-fowl. Although fish can be classified as game, the fish and fisheries are discussed under a subhead with that title in this lecture.

B. Property in Game

The theory of property in game has already been discussed. It is the purpose here to show the history of the ownership of game.

Originally, the ownership of game in England was in the English king as a personal prerogative. In the course of time it became established that this ownership was not in the king's prerogative but the title was in the crown in trust for the benefit of the English people.

Upon the Declaration of Independence, each state or colony in America became vested with the same title and interest to game within its respective boundaries as was held by the crown. In other words, each state held title and ownership to the game within its boundaries in trust for its people. When the Federal Constitution was adopted, the member states of the union were not deprived of their title to the game, but each retained the title of the game in trust for the people of that state. Game within additional territory acquired by the Federal Government remained in the United States and was held in trust for the people of the state subsequently organized out of this territory. Before the organization of these new states, the Federal Government held exclusive title in the right to regulate game within these territories. After each new state was created it succeeded to own state property rights held by the United States, and the title to the game in trust for the people was vested in the state.

The title to game acquired by the state was by virtue of the

old common law, and no statute is necessary to invest it with the ownership of game, and any state statute so declaring is merely declaratory of the common law rule.

C. Ownership of Game Reduced to Possession

The rights of individuals to reduce game to absolute ownership by killing it has been already discussed. The state, through its regulative agency, has a right to impose any restrictions on the taking or possession of the game that it deems advisable for the good of the whole people.

II. THE RIGHT TO HUNT

A. Dependent on Ownership of Soil

The title to all wild game being vested in the state in trust for the benefit of all of the people of the state, each individual has a right to take and reduce such game to private ownership, subject to general rules and restrictions.

1. The regulations that the state may make concerning the taking, killing, and possession of such game.

2. The exclusive right to hunt on a given tract of real estate is vested in the owner, and no person has a right to hunt on such private premises without the permission of the owner. No regulation can authorize an individual to enter upon private land and take or kill game.

It has been held that a hunter has not the right to shoot upon premises of an individual owner or to go on his premises to get game which has fallen there.

B. Right to Shoot Waterfowl

The public has a right to resort to public waters to shoot waterfowl, but in the case of private property the public has no fowling rights. The right to shoot waterfowl on a private body of water is vested exclusively in the owner of the soil beneath the water, and he is entitled to enjoy alone the same hunting privileges as he would on any other private lands. The hunter does not have a right to pass over private property to reach a public shooting ground. As a general rule navigable waters are public waters, and the public waters, and the public has a right of fowling in navigable waters. However, this is not the criterion.

Even in navigable waters if the ownership of the soil beneath the waters is in private ownership, the public does not have fowling rights in such waters, even though he may have a right of free and uninterrupted passage by boats over such waters considered as being navigable. Fowling is not incident to the public right of navigation, therefore, the public would not have a right to shoot waterfowl from such waters. The ultimate test

of the right of the public to shoot waterfowl depends upon the ownership of the soil beneath the water.

C. Acquisition of Hunting Rights in the Premises of Another

The right to hunt on the premises of another can be acquired by permission or a grant. It has been said that the right to hunt on the premises of another is not merely a license but is an interest in the real estate in the nature of an incorporeal hereditament, and must be in writing if enforceable as such against the owner. The right to hunt on the premises of another has been called profit a prendre. This right obtained by written grant, is a right enforceable by law against the owner or his subsequent grantees.

D. Remedies for Violating Hunting Rights

Any intrusion upon the private property of another for the purpose of hunting is subject to action for damages, although the damages may be nominal. In Indiana there is a statute which limits damages of the owner to twice the value of the article damaged. There is also a statute in Indiana which makes it a criminal offense to trespass on the land of another while hunting. Injunctive remedy may also be had against an insolvent trespasser. Not only is injunction a remedy for the protection of an exclusive hunting privilege, but if a member of the public is denied the common right to shoot on public waters the interference with his right may be enjoined.

III. VALIDITY AND CONSTRUCTION OF GAME LAWS

A. Power to Enact Laws

It is a general rule from which there is no dissent that the state has authority to make rules and regulations tending to conserve game within the jurisdiction of that state. Any reasonable limitation does not deprive a person of his property because he who takes or kills game has no previous right or property in it, and when he acquires such right by reducing it to possession, he does so subject to all conditions and limitations as the legislature has seen fit to impose.

It is not only the right, but the duty of the state to take steps to preserve the game from the greed of hunters, and although the state derives title to game by inheritance from the English crown, this title not only justifies regulations but the good of the public's interest in game may be protected under the state's police power.

This protective power extends not only to game as a useful article of food, but to other animals and birds. It has been specifically held that the state may protect wild beavers although they are destructive to private property. A statute forbidding

the destruction of beaver dens is a proper exercise of police power, although the beavers will destroy trees on neighboring land for food.

It has been held that the state is not liable for injury to private property by beavers which it imports or attempts to protect by statute.

D. Discrimination

Game laws are not considered discriminative when they provide greater restrictions and severer penalties against nonresidents than against residents. If a state sees fit to prevent a non-resident from taking game in this state, it may impose upon him a larger license fee and more restrictions than it imposes upon its residents. It has been held, however, that where two individuals owning real estate in one state, and one being a resident and the other a nonresident, the legislature cannot pass a statute which forbids a nonresident to hunt on his own premises, and yet permit the resident to hunt on his.

C. Criminal Prosecutions

Statutes in all states, including Indiana have made slightest infraction of the game law punishable by fine or imprisonment. It is important to notice that in connection with the enforcement of the fish and game laws intent is not a necessary ingredient of the crime unless it is so made by the statute. The regulation may make the possession of certain game in closed season a criminal offense, irrespective of the intent of the possessor. It has been held that a game law is not invalid because it makes the penal character of the acts depend on the by-laws of certain game societies.

D. Forfeiture of Hunting Apparatus

As a general rule under the police power of the state, legislature has the power to declare certain property which may be used only for an unlawful purpose to be a public nuisance, and to authorize the same to be abated summarily by public officers. If the property is of a nature innocent in itself and susceptible of a beneficial use, but has been used for an unlawful purpose statutory provisions must afford the owner thereof with an opportunity for a hearing.

E. Application of Statutes to Game Killed in Another State

There seems to be two rules followed in this country as to the application of game laws in one state to domestic and foreign game. One rule which has been stated before as being an Indiana rule, provides that where a statute does not by express language indicate that game of another state is excluded, are included. The term "game" or "any game" refers to all, both domestic and foreign.

The other rule, followed in a number of states, holds that criminal statutes must be strictly construed and the term "game" or "any game" refers to domestic game only. Where a statute indicates clearly intention of the legislature to include both domestic and foreign game, it seems that the rule would be the same in both states.

F. Exportation of Game

The title to game being vested in the state, the regulative agency of that state has such power and control that it may prevent the taking or transporting to another state. The theory is, of course, that when he takes the game he takes it subject to the restrictions imposed by the state.

It has been held that where the statute prevents the shipment of game out of the state, the delivery of game to a carrier for transportation to a point beyond the boundary of the state constitutes a violation of the statute, although the game, while still in the state, is taken from the carrier by a warden of the state under process of law.

G. Importation of Game

It has been generally held that the state may legally pass a statute which forbids at any specified time the sale or possession of certain wild animals or game, and as a means of preventing evasions of its game laws, the state may make such statute applicable to game killed in another state. There seems to be no question that the state has a power to make its police regulations apply to game captured without the state.

IV. PARTICULAR REGULATIONS

A. Closed Seasons

The state, of course, may provide for closed seasons on taking game, and may prevent the possession for any purpose that species of game during that season, and such a statute may apply to such game retained in captivity as well as at large.

B. Sale or Possession

Likewise, legislature, in order to effectively enforce its regulations against the killing and taking of game, may prevent the sale at any time or during certain times, and these regulations may be applicable to game killed in another state or to game raised in captivity. When the citizen accepts the state's grant of taking or retaining game, he accepts it embraced with all the restrictions and limits laid upon him, and if he loses that which he has taken, his constitutional rights have not been violated.

C. Transportation

Consistent with reasonable regulations for the protection of game, the state may prevent the transportation of game or otherwise

regulate it, and these regulations may be applicable to game raised in captivity.

D. Limitation as to Quantity

To prevent indiscriminate killing, legislature may impose restrictions as to the number of game that may be killed at a certain time or possessed at a certain time. Such a statute cannot be said to establish an illegal discrimination because it destroys the occupation of hunters, and when the limit is such that it allows the sportsman all the opportunity he wishes for hunting.

E. Animals Raised in Captivity

Primarily, the purpose of game laws is to protect from unreasonable discrimination wild and domestic game. However, in order to prevent violation of laws by subterfuge, the state may extend its regulations to include animals raised in captivity.

V. FISH AND FISHERIES

I. Introduction

A. Scope of Lecture

The purpose of this part of the lecture is to cover the relation between man and that part of game classified as fish and to treat on the nature and kinds of piscatorial rights the acquisition and incidents of rights to fish in public or private waters, and the general manner of regulation of fish and fisheries.

The term shall include mussels. This part of the lecture will not go into detail of the various rights of fisheries and government regulations as to rights involved as they are practically identical to the rights to take game and governmental regulations concerning taking of game, and it is not necessary to discuss again its fundamental rights.

B. Property in Fish

The title to fish and fisheries is in the state in the same manner as the state has the right and title to game animals to reduce them to possession under the same regulations and restrictions, and with the same qualified property interest.

C. Property Ownership of Fish in Private Waters

As an elaboration on what has already been said on rights of individuals in fish in private waters, it should be said that the same regulations apply to private waters as to public waters, except in such private inland ponds which afford no means of passage by which fish can migrate to the waters of other owners.

When such conditions exist the single owner shall be deemed property owner of the fish, as well as the fishing rights in the pond.

II. Nature and Kinds of Fisheries

A. Kinds of Fisheries

The term fisheries in common parlance denotes a place of fishing. The term fisheries in its legal sense could be defined as a right to employ within a particular stretch of water lawful means for taking fish which may be found there.

The two general classes of fisheries are known as exclusive and the common right of fishery. An exclusive fishery is one in which the person has an exclusive right to fish in a given place, either with or without the property in the soil at such place. A common right of fishery generally means a fishery which is open to a number of persons or to the public generally.

B. Fishery as Property Right

The right to take fish in a particular place is a property right in the same way and to the same extent as is a right to hunt. This right is an interest in real estate, and is known as a profit a prendre.

C. Ownership of Soil

Exclusive fisheries belong to the ownership of the soil.

III. Rights to Fish in Public Waters

These rights were indirectly discussed under the part of the lecture concerning fowling on rivers, and will not be extensively discussed here. Fishing, like fowling, may be carried on by the public in public streams as a general rule. However, if the state has conveyed the title of the soil in a navigable water, the grantee may have exclusive fishery over such soil. In this state the general rule is that the public has a right to fish in all navigable streams. It is difficult question and one that is not well settled in this state as to what constitutes a navigable stream.

The public right to fish in a navigable stream arising from the fact that in such streams the title to the bed of the stream is in the state, and not from any rule that the right for the public to fish is incident to the right of navigation, it seems to be a general rule that the public can acquire a right to fish in the waters of this state by prescription or by dedication as well as some law concerning it in this state. It is very much an unsolved question.

IV. Regulations of Fishing

The state has the power to regulate fisheries in public and

private streams for the preservation of edible fish in the same manner and to the same extent as it has the authority to regulate the taking of other game. The power to make these regulations is based on the same authority as the power to make regulations concerning game.

The power of the state to regulate the taking of fish also includes the power to regulate and protect the waters in which they are found, and it is immaterial whether that they are navigable or not.

There is an important rule in connection with fish in streams which should be noticed here. Although an owner who owns the bed of a river may have exclusive fishing rights within the limits of the ownership, he does not have any authority to place any obstruction in the river to prevent the fish from migrating from one proprietor to another.

The right of the state to regulate the time of taking, the manner of taking, and the size, possession, and sale is undisputed. Fish may be regulated to the same extent as may game animals.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

WARDEN; POWERS AND DUTIES; COURTS, CRIMINAL PROCEDURE;
SEARCH, SEIZURE; PROSECUTIONS; GOOD PRACTICES AND FISH
AND GAME CODE.

I. WARDENS -- POWERS, DUTIES, FUNCTIONS.

A. Under Fish and Game Code

1. Game Wardens and Deputy Game Wardens.

Game wardens, who are defined in section 2 of the Fish and Game Code as being salaried officers, will be appointed by the Governor, and will receive a salary as prescribed by the Governor. Deputy game wardens are defined as being non-salaried officers, and shall be appointed by the Director of the Division of Fish and Game of the Department of Conservation. Game wardens will serve at the pleasure of the Governor, and their appointment shall not be over a term of four years. Deputy game wardens shall serve at the pleasure of the Director of Division of Fish and Game and without remuneration.

2. Certificate of Appointment from Director.

Each game warden and deputy game warden shall be furnished with a certificate, showing such officer's appointment, and the term of his appointment.

3. Powers and Duties.

The Fish and Game Code makes it a duty of the wardens and deputy game wardens to enforce the Fish and Game Laws of this state. Deputy game wardens have the same power and authority to enforce the Fish and Game Laws of this state as do Game wardens.

4. Service of Process

Game wardens and deputy game wardens are peace officers for the purpose of enforcing the Fish and Game Laws of Indiana. As peace officers, they have the right and authority to arrest, without warrant, persons in the act of committing violation of the Fish and Game Laws, and, as peace officers, they are vested with all the powers, duties, and authority conferred by law upon peace officers. Gamewardens and deputy game wardens have the power to serve all warrants and processes issued by any justice of peace court or any other court having jurisdiction over fish and game laws any place in Indiana.

5. Interference with Wardens Prohibited.

The Fish and Game Code makes it unlawful for any person to interfere with wardens in lawful discharge of their duties. Wardens have the power to enter upon public or private property for the purpose of patrolling or investigating violations of the Fish and Game Laws, and they have authority to search and take possession of any game, possession of which is illegal, or which has been illegally taken. He has similar authority to seize and take possession of any hunting and fishing devices, possession of which is declared by the Fish and Game Laws to be illegal, or which the person is using in an illegal manner.

A more specific discussion of the powers of wardens and deputy wardens to arrest with and without warrants, and to seize

property or game with or without warrants will be discussed in another place.

II. COURTS - CRIMINAL PROCEDURE IN FISH AND GAME LAW VIOLATIONS.

A. Justice of Peace.

1. Jurisdiction as to Territory.

Jurisdiction is the power of the court to hear and determine a cause, and is defined by statute.

The jurisdiction of a J. P. court in criminal cases is co-extensive with his respective county. A J. P. court has jurisdiction over a person committing a crime in any township of the county with certain exceptions with which wardens are not concerned. If an offense is committed partly in one county and partly in another county, the J. P. court in either county has jurisdiction. Persons charged with unlawfully transporting game in this state may be prosecuted in the county where the game was received for transportation, or in any county into which the game may come in the course of transportation, or in the county where the game reaches its destination. Offenses committed on the Wabash River where it forms a boundary between Indiana and Illinois may be prosecuted in any county bordering on the Wabash River where it forms a boundary.

It is important to note that the evidence at a trial before a justice of peace must show that the offense was committed in the county in which the justice of peace is sitting or the defendant must be acquitted.

2. Jurisdiction as to subject matter.

a. Exclusive Jurisdiction.

J. P. courts have exclusive jurisdiction when the fine fixed by the statute cannot exceed three dollars.

b. Concurrent Jurisdiction.

J. P. courts have concurrent jurisdiction with the criminal and circuit court of the county where the justice is sitting to try and determine all misdemeanors which are punishable by fine only.

c. No Jurisdiction.

J. P. courts do not have jurisdiction if the minimum fine prescribed by the statute exceeds twenty-five dollars. The justice of peace does not have jurisdiction if the statute makes it mandatory that the court impose imprisonment as part of the sentence. It is mandatory where the statute uses the words "must" or "shall be" imprisoned. Where imprisonment is discretionary with the court, J. P. courts have jurisdiction. In many cases in violation of the fish and game laws imprisonment is mandatory upon the court if it is a second offense, and the J. P. courts do not have jurisdiction. If wardens intend to prosecute a violator for a second offense, he should examine the statutes closely to determine whether or not the J. P. courts will have jurisdiction before an affidavit is filed.

3. J. P. courts have no Jurisdiction over Felonies.

There is only one law in the fish and game code that makes it a felony for violation of that law, and that is section 36, which regulates use of explosives in lakes and streams. Where the offense is a violation of this section, the action must be instituted in the circuit or criminal court of the county where the crime was committed.

City courts have jurisdiction only on the first offense, and

can assess a fine only, in violation of section 36.

4. Preliminary Examinations.

Justices of Peace have authority to make examinations in all cases. If a crime is committed, the offender may be taken before the J. P. court and there the justice may inquire as to whether or not there is sufficient probability of defendant's guilt to warrant the justice requiring a bond for the defendant's appearance in the proper court. Preliminary examination before a justice of peace is not a trial, and any judgment rendered by the justice in such a case is absolutely void. Wardens would not be concerned with this function of the J. P. court with the possible exception of the use of explosives in waters of this state without a permit from the Director, being section 36 in the code.

5. Jurisdiction of the Person.

J. P. court can obtain jurisdiction of the person by a warrant or summons, unless the person appears and pleads guilty to the charge. If a warden should arrest, without a warrant, any person violating the law, he should obtain the proper warrant for the arrest immediately, and serve the same as in other cases. Peace officers, and wardens are peace officers, have authority to arrest without warrant and to hold the defendant only until the proper warrant can be obtained.

6. Time Prosecution Must Be Commenced.

Prosecution for violation of any of the fish and game laws of this state may be brought at any time within two years after the commission of the offense. Prosecutions are commenced when the affidavit alleging the violation has been filed with the justice.

B. Justice of Peace - City Courts.

Cities of the 1, 2, 3, and 4th classes have a city court with a judge, clerk, and bailiff. In 5th class cities the mayor exercises the same powers as the city judges. City courts in 1, 2, 3, and 4th class cities, and the mayor in 5th class cities have original, concurrent jurisdiction with the Circuit and Criminal court of that county in all cases of violation of the fish and game laws. City courts may impose a fine of \$500.00 and imprisonment in the county jail not exceeding six months, or both. In Marion County, instead of a city court, there are municipal courts which have the same jurisdiction as city courts for first class cities. City courts acquire jurisdiction in the same manner as J. P. courts and have the same authority to issue warrants for arrest, or for search or seizure. There are conferred on city courts by statute many powers not enjoyed by J. P. courts, but for the purposes of enforcing the fish and game laws, wardens need not be concerned with these extra powers.

C. Circuit and Criminal Courts.

Circuit or criminal courts have jurisdiction of all crimes committed within the county. In counties having criminal courts they have, of course, original jurisdiction of crimes in that county.

D. Arrest of persons charged with Violation of Fish and Game Laws.

1. Arrest, definition - how made.

Arrest is the taking of a person into custody that he may be held for public offense. Arrest is made by an actual restraint of the person of the defendant or by his submission to the custody

of the officer, but the defendant shall not be subjected to any more restraint than is necessary for his arrest or detention.

2. Arrest - Means Employed.

Only such force as is reasonably necessary may be lawfully used in making an arrest. It is the duty of the officer making the arrest to search the prisoner for any dangerous weapon or anything else in the officer's discretion that may be necessary for his own and the public's safety.

3. Officer's Authority - Manner of Arrest.

(a) If the offense is not committed in view of the officer, and he does not detect the defendant in the act of committing the offense, he must obtain a warrant for the defendant's arrest. J. P. courts and other courts having jurisdiction may issue warrants for the arrest upon receiving an affidavit charging the defendant with a crime committed in that county. Upon filing the affidavit with the J. P. or other court having jurisdiction, the defendant is brought within jurisdiction of the J. P. court or other court. This affidavit alleging an offense must be made by a competent witness, who will be a witness at the trial of the case. Wardens serving a warrant issued by a J. P. court may serve it on a defendant wherever they may find him in the State. They are not limited to the county in which the crime was committed.

(b) If an arrest is made under authority of a warrant, the warden must show the defendant that he acts under the authority of a warrant. The usual and accepted method of arresting persons under a warrant is to say to the defendant, "I have a warrant for your arrest", and at the same time or immediately after such a statement touch the prisoner and proceed to read the warrant to him. If, after informing the defendant that you have a warrant for his arrest, he either flees or forcibly resists, the officer may use all necessary means to effect the arrest, and if the arrested person strikes the officer, he is guilty of assault and battery. Wardens, in making an arrest under a warrant, may exercise only such force as is reasonably necessary under the circumstances to effect such an arrest. Force can only be justified by proving that resistance was offered or that preparation was made to offer resistance, and an effort to resist was manifested.

A warden, after giving notice of his intention and his authority, if refused admittance, may break an inner or outer door of any house or building to gain admittance to execute his warrant.

(c) Section 4 of the fish and game code specifically authorizes wardens to arrest, without a warrant, persons in the act of committing or attempting to commit a violation of the fish and game code, and are declared to be peace officer's for that purpose. Wardens may arrest any person violating any fish and game law of the State which is a misdemeanor, without a warrant. This power to arrest without a warrant by wardens extends only to arrest for misdemeanors committed in view of the officer. If the offense committed is a felony, the officer may arrest without a warrant if he has reasonable reason to believe that the defendant was committing a felony. The crime of felony and misdemeanor is defined by statute. All crimes and public offenses which may be punished with death or imprisonment in the state prison shall be

denominated felonies, and all offenses other than that shall be denominated misdemeanors. Offenses in violation of the fish and game code are all misdemeanors except one, and that is the use of explosives in any of the waters of the state without first obtaining a permit from the Director. Violation of this law is a felony.

The power of wardens to arrest without a warrant is limited to cases of necessity, and the person so arrested should be detained only a reasonable time until a proper legal warrant can be obtained.

When a warden arrests a defendant in the act of committing a crime in violation of the fish and game laws, he must state that he is an officer, and show, if required, his authority to arrest the defendant.

As has been stated before, wardens are peace officers and have limited powers of arrest without a warrant. They should conduct the defendant before a proper court and obtain a warrant, which should be served on the defendant. When a defendant has been lawfully arrested for a misdemeanor with or without a warrant, his person may be lawfully searched and evidence found is admissible.

4. Summons to a Corporation.

A corporation may be guilty of violating a fish and game law and a special method of bringing it into court to answer to a criminal charge is necessary, because of its peculiar nature. When a J. P. or other court has jurisdiction, and receives an affidavit charging the corporation with violation of the fish and game law, the court will issue a written summons to notify the accused; the summons being returnable the tenth day after the date of filing of the affidavit. The summons, together with a copy of the affidavit must be served upon the corporation in the same manner as now provided by law. If the corporation fails to appear upon the return day, the clerk of the court will enter a plea of not guilty on the docket, and thereafter the corporation shall be considered by law as being continuously in court until the case is finally disposed of.

E. PROCEEDINGS AFTER ARREST.

1. Docketing the Cause.

After the defendant has been arrested and taken before the J. P. court, the court shall docket the cause in his docket under the title of "State of Indiana v. _____", inserting in the blank space the surname of the defendant.

2. Fixing a Time for the Trial.

The J. P. court is required by law to give the defendant an opportunity to employ an attorney or counsel, and to advise the defendant of his constitutional rights. The J. P. court is required to notify the prosecuting attorney of the time of the trial. Neither the defendant nor the state has a right to insist upon trial before both parties have had a reasonable opportunity of preparing their cases.

3. Subpoena of Witnesses.

Both the state and the defendant may subpoena witnesses and compel their attendance. Witness subpoenas may be issued in the same manner as they are issued and served in civil cases. The state is not required to tender witness fees in order to compel their attendance.

4. Continuances.

Continuances may be had if the case has been set for trial, and when a continuance is had, the defendant should be recognized to appear at the time set for the trial of the cause. Witnesses may be recognized in the same manner as the defendant.

5. Change of Venue.

Defendant may have a change of venue as in civil cases, and upon proper application by the defendant. Only one change of venue from the township and one change from the justice is allowed the same party.

In change of venue from the J. P. court, the justice from whom the change is taken must fix the date of trial before the justice to whom the cause is sent, and recognize the defendants to appear before that justice on that day. The justice shall make out a complete transcript of the docket entries in the case, certify thereto, and submit together with all papers to the justice who shall try the case.

Under an act passed by the 1937 Indiana General Assembly it was provided that either the state or the defendant may have a change of venue from the trial judge. It was the intention of the legislature that this statute apply primarily to trial judges in the circuit and criminal courts. However, it is not limited to those courts and it would, no doubt, apply to J. P. courts. The change of judge is obtained by the filing of an affidavit of bias or prejudice of the trial judge. The judge immediately nominates three competent and disinterested persons who are available attorneys or judges and the state and defendant each strike off one of such nominations. The judge then proceeds until the acquittal or conviction of the defendant.

6. Sufficiency of Affidavit.

An affidavit charging crime is sufficient if it can be understood therefrom that:

1. The offense charged was committed within the jurisdiction of the court or is triable therein.
2. That the offense charged is set forth in plain and concise language.
3. That the offense charged is stated with such degree of certainty that the court may pronounce judgment upon the conviction according to the right of the case.

The defendant may quash an affidavit when it appears on the face thereof:

1. That the facts stated in the indictment do not constitute a public offense.
2. That the indictment contains any matter which if true would constitute a legal justification of the offense charged or other legal bar to the prosecution.
3. The indictment does not state the offense with sufficient certainty.

Two or more offenses may be alleged in the same affidavit, and may be tried before the justice of peace together. Where the statute states two things disjunctively, as kill or possess, in preparing the affidavit they should be stated conjunctively, as kill and possess. To kill or to possess are separate and independent allegations, and, although they may be joined in the same affidavit, they should be stated in two counts. When an affidavit is faulty on its face, the proper procedure is a motion to quash,

which should precede the arraignment and plea thereto. If an affidavit is quashed by motion of defendant, or his attorney, the defendant shall not be discharged but he shall be recognized by the justice to appear and answer to the charges of an amended affidavit. Under the present statute prosecuting attorney may amend an affidavit at any time up to and including the time of the trial, provided, he does not change the party charged or charge a new or different offense.

7. Arraignment.

Arraignment is the stating of a charge to the defendant and taking his plea thereto, and it is done in the following manner: The affidavit charging the crime is read by the justice of peace, and the defendant is asked by him how he pleads thereto. If the defendant pleads guilty, the justice of peace, providing he has jurisdiction of the charge, shall assess the penalty and enter judgment, and make up his docket. The justice of peace, on a plea of "guilty", may take any evidence that he may deem necessary in order to determine the amount of the fine. The defendant is at liberty to introduce any witnesses in his own behalf to mitigate his offense. The justice of peace is required by law to make a docket entry in the proceedings of the trial before him, and must show therein the amount assessed and taxed, if the accused is found guilty, and if the fine and costs are paid or stayed. The J. P. may delay judgment until the evidence that he may deem necessary has been received.

F. TRIAL.

1. Trial by the Justice.

The defendant charged with the crime must be present at the trial and must be present when the judgment is pronounced. It is not necessary that defendant be present when the justice of peace court or other courts hear arguments on motions to quash or on motions for change of venue. The defendant may, if he so requests, have his cause tried by a jury of twelve men. The state may also request and have a jury.

(a) Order and Procedure at the Trial.

The prosecutor makes the opening statement. The prosecuting attorney states briefly his case and then immediately introduces the evidence to support it. After the state has introduced its evidence and rests, the defendant or his counsel may make their opening statement to the court. The counsel for the defense states the defendant's case, and briefly states the evidence which he expects to support it. Neither the prosecuting attorney nor the counsel for the defense should be permitted in their opening statements to go beyond the range of that which will be or has been legitimate evidence in the case. After the defendant's opening statement, he will introduce his evidence.

(b) Admissibility and Materiality of Evidence.

There are various classifications of evidence which may be offered in support of the prosecution or the defense. They are as follows:

(1) Direct Evidence.

Direct evidence is the testimony of a competent person or persons who saw the commission of the crime charged in the affidavit. They are the eye witnesses.

(2) Circumstantial Evidence.

Circumstantial evidence are facts inferred from the circumstances that are found surrounding the offense charged. It is

usually a chain of evidence or circumstances so closely connected with the offense charged that it cannot be satisfactorily explained consistently with the innocence of the defendant.

(3) Corroborative Evidence.

Corroborative evidence is evidence offered in support of evidence already given to prove a point.

(4) Documentary Evidence.

Documentary evidence is evidence in the form of writing, typing, letters, telegrams, signatures, bills of sale, etc.

(5) Expert Evidence.

Expert evidence is evidence offered usually by professional men or by men with special training in a certain line such as chemists, dentists, doctors, and handwriting experts, fingerprinting experts, etc.

(6) Hearsay evidence is testimony offered by some person who heard statements concerning the defendant but not made by the defendant or in the defendant's presence. Such evidence is not admissible in any court.

The fact of a violation of a law must be proven by direct or circumstantial evidence. If circumstantial evidence is relied on for conviction, each fact necessary to the conviction of the defendant must be proven by competent evidence beyond a reasonable doubt. The fact or circumstances pointing to the defendant's guilt must be proven by competent evidence, and must tend so strongly toward the guilt of the defendant that the facts proven cannot be consistently explained with the innocence of the defendant.

A defendant may be cross-examined concerning criminal offense committed by him previous to the offense for which he is on trial, for the purpose of discrediting his testimony.

(c) Competency of Witnesses.

The following is a statutory definition of competent witnesses in this state.

1. All persons who are competent to testify to civil actions.

2. The party injured by the offense committed.

3. Accomplices when they are competent to testify.

4. The defendant may testify in his own behalf, and if he does, is subject to cross-examination. If the defendant does not testify in his own behalf, his failure to do so is not subject to comment by counsel nor considered by the jury.

If a defendant elects to become a witness for himself he cannot be compelled to give evidence against himself.

Any competent witness may be compelled to give evidence against the defendant which may tend to incriminate the witness, although the evidence disclosed by the witness may not lawfully be used against that witness in a subsequent prosecution.

Before a testimony of a witness is received he is placed upon his oath, and witnesses may be separated before the trial in order to prevent them from fabricating or getting together on a story.

(d) Argument of Counsel.

After all of the evidence has been offered by the prosecutor and defense, and there is no rebuttal testimony the case may be submitted to the justice without the argument of the counsel. If arguments are requested, the prosecuting attorney shall make the opening argument, and he must disclose all points relied on for

conviction in the case. The defendant or his counsel may argue the case in behalf of the defendant, or if they offer no argument, the case is closed and goes to the justice for finding and judgment. If a defense argument is offered, then the prosecuting attorney may answer and close for the state, and in this closing argument he must not refer to anything not covered in the opening argument, or shall defendant answer thereto.

(e) Procedure when Wrong Offense is Charged.

If it is discovered in the course of a trial that the defendant is not charged correctly, or the wrong offense has been charged, the justice of peace shall cause the proper affidavit to be prepared charging the proper offense, and recognize the defendant to appear and answer to the same.

(f) Finding and Judgment.

A defendant is presumed to be innocent until he is proven guilty. Where there is a reasonable doubt whether the evidence has shown the guilt of the defendant as charged, he must be acquitted. Where one or more defendants are charged jointly in an affidavit, judgment may be rendered against the one person. When there is a finding of guilt of the defendant as charged, and judgment is entered upon the finding, judgment shall be entered for fine and costs, which shall be part of the judgment, and the defendant stands committed until the fine is paid or replevied. The justice of peace is required upon the plea of guilty or upon conviction of violation of any fish and game law to assess the fee of five dollars as part of the costs. In some cases the courts have held that the justice of peace may refuse to assess costs as part of the judgment. Under section 152 just referred to in the fish and game code it appears mandatory that the justice of peace assess the five dollars in favor of the Division of Fish and Game as part of the costs. No costs are taxed in the case of acquittal.

If the justice of peace finds the defendant guilty, he shall be permitted by law to assess a fine not exceeding twenty-five dollars.

2. Trial by Jury.

(a) Venire.

When a jury has been requested, the court will issue a venire for twelve qualified voters, householders, and freeholders of the county. This writ of venire is directed to the constable, authorizing him to summons a jury. The constable exercises his own judgment as to the persons whom he calls to serve as jurors. The venire is personally served by the constable and return must contain all the names of the jurors summoned.

(b) Impanelling Jury.

The jury is impanelled when they are sworn by the court to give true answer to the questions touching on their competency. The jury is impanelled when there are present twelve qualified jurors.

(c) Challenging Jurors.

After the jurors have been impanelled, they are questioned as to their competency first by the defendant and then by the prosecuting attorney. Jurors may be challenged and dismissed under two kinds of challenges, peremptory and challenge for cause. Peremptory challenges are limited to three in number, and it is unnecessary that you give any reasons in peremptory challenges.

Grounds for challenge for cause are:

1. That the juror has formed or expressed an opinion as to the guilt of the defendant or his innocence.
2. That the juror is related within the fifth degree to the defendant.
3. That he has served on a jury which was sworn in the same case against the same defendant, which jury was discharged after hearing the evidence.
4. That he served as a juror in a civil case brought against the defendant for the same act.
5. That the juror has been subpoenaed as a witness in the case.
6. That he is an habitual drunkard.
7. That he is an alien.
8. That he asked to be called for jury service, or came at the request of another other than the constable.
9. That he is biased and prejudiced for or against the defendant.
10. That he does not have the qualifications of a juror prescribed by law, because of defective hearing or sight is unable to comprehend the evidence.
11. Has a personal interest in the result of the trial.

When jurors are dismissed the court may order the constable to fill the panel by selecting bystanders. However, the request of either the defendant or the prosecuting attorney, jurors must be selected from persons outside the court room.

(d) Swearing of Jurors.

After the defense and the prosecuting attorney have passed the jury, the J. P. must swear them to try the cause.

(e) Trial - Rules in regard to the Order of Trial.

The rules as to the introduction of evidence, degree of proof thereafter, are the same as in trials, before the justice of peace without a jury. Counsel and prosecuting attorney may read from law books, and either party may request written instructions to the jury, and the court may refuse to give instructions in whole or in part. Juries are exclusive judges of both the law and the facts. The defendant, during the trial and until final judgment is rendered, is in the custody of the constable, unless the defendant is under a recognizance bond.

(f) Deliberation and Verdict.

After the evidence has been submitted and there has been argument of counsel, and the justice of peace has given instructions, the jury shall retire and deliberate on their verdict. Upon reaching a verdict they shall report the same to the justice in open court. If the jury cannot agree, they shall report their disagreement and be discharged. If the jury finds that the defendant should not pay the costs, they shall so find and state in their verdict. It is doubtful whether or not a jury can lawfully decide that the defendant is exempt from the costs assessed by the fish and game code on pleas of guilty or on conviction.

(g) Entering Judgment.

The justice is compelled by law to enter judgment upon the verdict no matter how erroneous he may deem it. The justice cannot set aside the verdict granting a new trial or suspend judgment. If the jury or the justice are of the opinion that twenty-five dollars is not adequate punishment, they may so find and in

such case the justice shall hold the prisoner to bail for his appearance before the proper court having authority to assess a larger fine. The justice of peace may commit the defendant to jail in default of such bail.

3. Procedure after trial.

When the defendant fails to pay or replevy judgment, it is the duty of the justice of peace to commit him to jail where he shall remain one day for each dollar which was fined and the costs so adjudged against him. This action is mandatory upon the justice of peace. The prosecuting attorney or any other interested party cannot lawfully agree to the defendant's liberty after judgment has been rendered against him unless the fine and costs are paid or replevied. Once judgment has been rendered the defendant must pay, stay, or go to jail.

The defendant may replevy the judgment rendered against him in a J. P. court for ninety days in the same manner as judgments are replevied in civil cases. Judgments are replevied by personal surety bonds to the satisfaction of the J. P. court. When the time for the stay expires, the justice shall forfeit the bond, issue execution, and commit the defendant to jail.

Within ten days after judgment in the J. P. court, the defendant may appeal to the circuit, criminal, or superior court and such case shall be tried or otherwise disposed of in that court within ninety days after the entry of judgment of the conviction in the J. P. court or city court from which the appeal was taken. The defendant, however, upon application may have an extension of that time if the application is made before the ninety days have expired. If no extension has been granted and the ninety days have expired, the court to which the appeal was taken is without jurisdiction, and the prosecuting attorney shall dismiss the appeal, and the judgment from which the appeal was taken shall be final and carried into execution.

III. SEARCH AND SEIZURE.

(a) Search Warrant.

1. Nature, scope, and source of power.

The sole purpose of a search warrant is a discovering at a particular place, and a seizure of specified articles which constitute or contain evidence of crime. Dwellings and adjacent premises of inhabitants of this state are under the highest protection against unlawful searches, and are not to be invaded save and except upon full compliance with the statutory and constitutional requirements.

2. Unreasonable Search and Seizure.

The constitution of Indiana guarantees every person against unreasonable search and seizure. This is a personal right or privilege to the owner of the premises, and it cannot be asserted by others than the persons whose right is invaded. All searches and seizures which are executed in violation of the law are unreasonable search and seizures.

3. Issuance of Search Warrants.

Section 8 of the fish and game code authorizes justice of peace to issue search warrants to search any houses or places for seines, fishing nets, fishing traps, fish spears, or any implement or device used or kept for use in taking fish, frogs, mussels or game unlawfully. Justice of peace have the same authority to

issue warrants to search for wild birds, wild animals, fish, frogs, or mussels, possession of which is at the time unlawful. Under this section of the code, search warrants, in form and substance shall be the same as now provided for the issuance of search warrants in other cases.

The statute of Indiana concerning issuing of search warrants requires that no search warrant be issued until there is filed with the justice of peace an affidavit which shall set out:

1. Particularly describing the house or place to be searched.
2. The things to be searched for.
3. Alleging substantially the offense in relation to the things being searched for.
4. A statement that the person making the affidavit has good cause to believe that the thing to be searched for is concealed.
5. Setting forth the facts in the knowledge of the person making the affidavit which he believes constitute probable cause. Any other evidence heard for the purpose of establishing probable cause shall be reduced to writing and filed with the affidavit for the search warrant.

In describing the property to be seized or searched in the warrant, the description should be so specific as to leave no discretion in the officer making the search. The thing to be searched for must be specifically described in such a manner that the officer making the search would have no discretion as to the thing searched for.

The warrant should contain the full name of the person whose premises are to be searched. Information from a creditable source, together with facts known to be or observed by officers indicating that such information is correct may be sufficient to show probable cause in issuing a search warrant.

4. Service, Execution, and Return.

In issuing search warrants there must be strict compliance with all formalities required by law. An officer is authorized to search only one premises described in the warrant issued to him, and he has no discretion to extend the search beyond that place described, nor to search for or seize any other thing or article other than that described in his warrant. The officer making the arrest must inform the defendant before entering upon the premises that he is acting under a warrant and it is good policy to read the warrant in its entirety to the defendant. A warrant for the search of a certain premises is properly served when made at the place designated in the warrant itself, and it need not be made on the owner of the premises. An officer who has been charged with the execution of a search warrant must proceed at the earliest opportunity to serve the same, and after reasonable time for making it has elapsed, the officer is without authority to do anything further under it, except to make a return to the court issuing it. If the article searched for is found in the place to be searched the officer making the search may seize the same and arrest the defendant. He shall return the article seized and the defendant to the court issuing the warrant.

5. Disposition of Property.

The justice of peace on receiving property under a warrant shall deliver the same to the sheriff. The sheriff of the county

receiving the property seized under a warrant and turned over to him by the court shall destroy the same if so ordered by the court, or shall safely keep such property subject to order of the court trying the defendant.

6. Hearing on Motions, Affidavits, and Evidence.

A search warrant may be attacked and its validity tested at any time. The proper motion in attacking an affidavit of warrant is by motion to quash. The court issuing the warrant may hear the evidence on the sufficiency of the affidavit touching on all the statutory requirements thereof. On a motion to quash a warrant, the burden is upon the state to sustain the writ. The legality of a search warrant is not available to any person not interested in the property searched or seized. The court issuing the search warrant, after hearing the evidence on a motion to quash, may quash or overrule the motion.

B. Search and Seizure without a Warrant.

1. In General.

Wardens, and other peace officers for that matter, are not authorized to break into or search private rooms without a warrant for the mere purpose of discovering evidence that a misdemeanor has been or is being committed, or arresting a person suspected of committing a misdemeanor. It has been held that persons lawfully arrested for driving an automobile at an unreasonable speed may be seized without a warrant, and the search may extend to the automobile and to the contents of packages in his possession. It is not necessary to obtain a search warrant to seize or search in open fields, woods, or lands which are some distance from a house or dwelling. The strict rules of law regulating the search of houses are not the same as those applicable to the search of automobiles or other vehicles which can be quickly moved and under proper circumstances an automobile or other vehicle may be searched without a warrant. Persons are only exempt from unreasonable search and seizure. A search of an automobile, if made upon probable cause may not be unreasonable although made without a warrant. It is difficult to lay down a rule when automobiles may be searched without a warrant. There are times when the facts constituting probable cause are sufficient to create a set of circumstances which might tend to render the search of an automobile impossible or impracticable if delayed until a warrant was obtained. The search of an automobile without a warrant must be justified.

2. As incident to arrest.

Wardens may search a person lawfully arrested for a misdemeanor committed in their presence, including the packages and bags carried and the automobile in which he is riding when arrested without a violation of the defendant's constitutional rights.

3. On Invitation.

If a search is made without a warrant at the defendant's invitation, he must be free from any coercion, duress, or fraud. There are very few cases where a defendant can be shown to exempt himself from his constitutional protection of unlawful searches by invitation. The statements of invitation are generally construed as being acquiescence in the authority of the officer. Rarely, if ever, should an officer rely upon the

invitation of the defendant to search his premises as being a waiver of the statutory and constitutional requirement that a search warrant be obtained to search private property.

4. Disposition of Property Searched.

Section 6 of the fish and game code authorizes and directs wardens to search at any time, without a warrant, any wild birds, wild animals, hides or fur of fur-bearing animals, frogs, mussels, mussel shells, or fish which have been caught, taken, or had in possession in violation of any of the provisions of the code. The wardens have the same right to search and take possession of, without a warrant, nets, seines, spears, traps, or musseling or fishing apparatus or devices. In the case of game, it may be seized if it is possessed or has been taken unlawfully. If the article seized is a hunting, fishing, or trapping device, it may be seized because the fish and game code has made possession of such a device unlawful; that is, if it is a device which is not capable of being used for a lawful purpose. The search and seizure is also extended to articles and devices which may be used for a lawful purpose but have been used by the defendants for an unlawful purpose. It is important to note that game or devices seized by wardens under this section of the code is in the custody of the warden, and if the defendant is convicted of violating any provision of the fish and game code, the article seized is forfeited to the state, and confiscated in the name of the state. Only articles seized under a search warrant are in the custody of the justice of peace.

IV. GOOD PRACTICES IN INVESTIGATIONS - ARREST, PROSECUTIONS, TRIAL.

A. Investigation - Rules.

It has been said that more criminal cases have been made by thorough and expert investigation than by skilled prosecution in the court room. Skilled investigators are the most important members of a prosecuting attorney's office personnel. The value of an orderly, thorough, and timely investigation is often unappreciated until it is too late. It is not necessary that a person be an intellectual giant in order to conduct a thorough investigation of a crime. It does take time, patience, and thoroughness. The following are a number of good rules to follow in conducting an investigation of a reported crime.

1. Make certain that some specific violation has actually been committed.
2. Determine if there is sufficient non-prejudicial evidence to support a conviction.
3. Determine that the witnesses are in good repute.
4. Fully investigate every angle of the case before bringing formal prosecution.

Wardens are interested in their official capacity as wardens exclusively in violations of laws for the protection of fish and game. Unless a fish and game law has been violated, they should not interest themselves in the case. When a report comes to a warden that a violation has occurred, it will usually, if not always, be presented in a story form, and it is for the warden to determine what fish and game rule has been violated, if any.

Quite often this cannot be determined until after the investigation has been in progress for sometime. When the warden has determined, and he must determine the specific violation, he will then seek evidence to support a conviction. Often a single act may constitute separate offenses. Evidence which the warden must rely on to prove violation should be of the highest type possible to obtain. Beware of individuals who are too willing to be a witness for the prosecution. On the other hand, if a competent and unwilling witness is necessary to prove the case for the state, they should be subpoenaed by the court. A warden must always exercise good judgment in this matter.

Accuracy and detail are two primary requisites in conducting an investigation. No detail, however small or appearing unimportant, should escape the investigator's attention. Many prosecutions have failed utterly because the warden or investigator overlooked what appeared to be an unimportant phase of the problem.

An effort should always be made to obtain the best witnesses possible; witnesses who are of good standing in the community. It is very often the case that the best witnesses do not wish to testify in the court proceedings. Do not tell the prospective witness that he is going to be a witness in the trial. Find out all you can about what he knows about the case, and after you have completed your investigation, you may then subpoena him as a witness. If you want to be absolutely certain that a witness will attend a trial serve a subpoena upon him. It quite often happens that witnesses will talk about a case, and will tell the investigator that they will appear and testify for the state, and then on the day of the trial they will not show up.

It is absolutely essential in making an investigation that the warden take notes and the following is an outline of what his notes should show:

1. What is the crime?
2. Who did it? Give the full name and address of the person committing the crime.
3. When done and where? The date and hour should be set down, and as near as possible an exact description of where the crime occurred.
4. How the crime was committed? With reference to the methods and devices used, if any.
5. Who shared in the crime? Here you should insert the full name of any accomplice in the crime together with their addresses.

The warden should make an effort to obtain not only testimony as evidence, but any articles, devices, or documents which would be admissible in evidence against the defendant.

The warden must always use good judgment in interviewing prospective witnesses. He should always be courteous, and should remember that a large percent of all testimony is prejudiced, although the witness may be honest in believing his testimony is unbiased or unprejudiced. Attempt should be made to determine if the witnesses' testimony is prejudiced, and, if so, why.

B. Arrest.

The essentials in making a lawful arrest have already been discussed.

If a warden fails to make the proper investigation and he loses the case, he has placed in his path another obstacle in enforcing the fish and game laws in his territory. If an officer uses bad judgment in making an arrest, he not only brings criticism upon himself but to the cause for which he is working. It is possible to arrest and convict a defendant of a serious violation of the fish and game laws, and yet retain the defendant's respect. He realizes that you are doing your duty, and he will tolerate any reasonable means that you use in effecting his arrest. Always treat your prisoner with courtesy and consideration, but remember that he is a prisoner, and take no chances that you will be placed in a position of disadvantage.

When attempting to make arrest, consider every possible chance of resistance or escape. Make it a rule not to attempt to arrest a defendant until you are in a position to prevent his escape if he resists arrest.

If your duty makes it necessary to arrest a person of good reputation and standing in the community, be essentially careful that all precaution is taken to prevent any unlawful humiliation of the prisoner. Although a warden should be courteous and considerate with his prisoner, he should not be easy. Many officers take pride in being able to make an arrest, remove the prisoner without exciting any public attention to the prisoner. After an arrest has been made, proceed immediately before the court.

The following are some good rules to follow in making an arrest:

1. Be sure you have a legal right to make the arrest.
2. Never betray a lack of confidence in your ability to make the arrest or provoke resistance by brutality, profanity, abuse or threats.
3. When dealing with criminals never allow yourself to be placed at a physical disadvantage.
4. Handcuffs are supplied to a police officer for the purpose of securing a prisoner after arrest. Judgment in their use is imperative. Persons of good reputation, property owners arrested for petty offenses should not be handcuffed unless resistance or attempt to escape make it necessary.
5. Prisoners should not be subjected to unnecessary humiliation.
6. When resistance follows attempted arrest, sufficient force to accomplish the arrest will be used. When resistance ceases the prisoner must be treated in a humane manner. Brutal treatment quickly gains a public sympathy for the most desperate criminal.
7. The prisoner will be taken as promptly as possible to a committing magistrate or Justice of Peace.
8. Because a warrant has been issued for a person's arrest, it does not necessarily follow that the person is guilty of the crime charged.
9. When it is your duty to arrest, let nothing prevent your doing so.

C. Prosecution and Trial.

Under our present criminal system wardens will have little or nothing to do after they have brought the prisoner before a court, except to act as a witness. Prosecuting attorneys assigned

to the justice of peace court conduct the prosecution. Remember that the prosecuting attorney knows little or nothing about the case he is called to prosecute, and he will appreciate being informed of all of the evidence that you have against the defendant.

It is your duty to make an effort to inform the prosecuting attorney of all angles of the case before the trial. You should give him a list of the witnesses, and a statement of the matters of which they have personal knowledge, and will testify to on the witness stand. Inform the prosecuting attorney of the exhibits or articles that you intend to offer as exhibits at the trial, but do not release custody of such articles to the prosecutor unless he gives you a written receipt for the same. It is wise for you to have prepared and placed in writing the information which the prosecutor can use in examining the witnesses. Avoid, as much as possible, whispering to the prosecuting attorney during the trial. However, if you believe that the prosecutor has left out any valuable evidence, do not fail to call his attention to it before he has completed the introduction of the evidence for the state.

The wardens' conduct while attending the trial and on the witness stand is often a controlling factor in obtaining a conviction, especially when the hearing is tried before a jury. The attention of the jury and spectators is focused upon the officer. He should keep in mind that he is a representative of a large sportsmen's organization, and his actions will reflect credit or discredit upon the department and the cause for which he is working.

In conducting hearings before the court, the warden should go about his duty in a quiet and dignified manner. His personal appearance should be at the best. The warden should refrain from conversations conducted in low tones among friends, the prosecutor, the constable, or other officers of the court. The defendant, not knowing what the conversation is about, may believe that he is being framed, and will not be given a fair and impartial trial.

It quite often happens that some time elapses between the investigation and the time of the trial. It is not only advisable but essential that the warden go over his original notes and check up on matters which he may be in doubt in regard to the distance, conditions, time, and other matters. In other words, you should as near as possible make yourself as familiar with the facts in the case as you were when you investigated them. When the case is called for hearing, and you are a witness, answer the prosecuting attorney in a quiet and courteous manner. All records and material evidence should be in your possession at the trial. When, in examination, the prosecuting attorney asks you a question which you are unable to remember, but have in your book some notes which will refresh your memory, ask the court for permission to look at your notes. Rules of evidence permit a witness to refresh his memory by referring to notes which he prepared at the time of the investigation. You should never refer to your notes until you have obtained the court's permission. Tell him that they are original, and that you prepared them at the time you investigated the case. Never consciously misstate the evidence or color your statements by emphasis. Answer all questions in a clear and even tone.

When you are called to the witness stand be serious and attentive at all times. Speak in a clear but not loud voice, and avoid any action which might convey the impression that you were a bully. Look your people straight in the eye.

Never should you carry or wear into court a firearm. When sitting in the witness chair do not look at the ceiling or floor while you are testifying, and do not fumble with a watch chain or other trinket. Sit perfectly still in a relaxed manner. Never argue with the prosecutor or the defense counsel, and never lose your head. Remember that it is a favorite trick of the defense counsel in criminal cases to confuse the witness by making him angry, and thus obtain statements that he would not ordinarily make. In telling your story be simple and direct, using the least possible number or amount of words necessary to make yourself clearly understood. If you are asked a question and you do not know, say that you do not know or that you do not remember. If the facts on which you are questioned are hazy, preface any statement that you make by saying "as nearly as I can recall." Never hazard a guess. Although you may refer to your notes occasionally, do not be a slave to them. If you study the case as you should before the trial, it will not be necessary to refer to your notes, except in a very few instances during the trial. After you have given your direct testimony, do not leave the court room. The prosecuting attorney may need you to rebut some testimony made by the defendant.

When the defendant or the defendant's witnesses are testifying make absolutely no signs that the testimony is affecting you one way or the other. If he makes a statement which you know to be untrue of your own knowledge or which you can disprove by some other evidence, inform the prosecutor immediately after the defense attorney has finished with the witness and turns him over to the prosecuting attorney for cross-examination.

It is well if you will inform the witnesses for the prosecution not to be controversial with the prosecuting attorney or the defendant's attorney, or not to make harsh denials or statements, and to conduct themselves in a proper manner. Never appear chummy with the court or address him by his first name. When you have occasion to address him use the words "Your Honor", and show him every courtesy and respect. Do not engage in any sociable conversation with the court.

After the decision or verdict has been rendered, accept it in a gracious manner without comment. Do not tarry in the court room, and do not discuss the case with other people who may be interested. Although wardens are authorized to collect from the court the fees taxed in favor of the Department of Fish and Game, he should not do it in the presence of the defendant. Ask the court to send the fees directly to the department, and thus you escape being a target for an untrue statement by the defendant or his friends that you obtained any money out of the conviction of the defendant. And you have been released of responsibility of remitting the fee.

If the defendant cannot pay the fine and costs, and is to be committed to jail, be sure that the justice issues to you proper committment papers, and then conduct the prisoner quietly and quickly to the place of committal.

V. FISH AND GAME CODE.

A. In General.

House Bill No. 23, which became a law under signature of the Governor on February 27, 1937, is a recodification of the fish and game laws of Indiana for the protection of fish and game in this state from the acts of 1881 to the acts of 1935. Many were inconsistent and because of the change in times and conditions were of no value. All of these old acts, with a few exceptions, were repealed, and their substance recodified and rewritten into one act which shall be known as the fish and game code.

There are a number of laws which are directly or indirectly connected with fish and game and law enforcement which were not repealed by this act for one reason or another. The reason for not repealing these laws will not be discussed here. These laws will continue to be a part of the fish and game code although they are not in the code:

1. A 1905 act which prevents the hunting on land of another without obtaining a consent of the owner.
2. A 1913 act which permits the establishment of fish hatcheries by the United States in Indiana.
3. A 1931 act which provides for the establishment of migratory bird reservations in Indiana.
4. A 1935 act which provides for the issuing of a live minnow permit.
5. A 1935 act which provides for the revocation of licenses where the defendant is convicted of violating the fish and game law.
6. A 1935 act which requires a permit to remove water vegetation from streams and lakes.
7. A 1935 act which provides for the regulation of the flow of water over dams in streams and rivers.

These exceptions, together with the fish and game code, constitute the fish and game laws of the State of Indiana, although a number of the acts mentioned above are not strictly fish and game laws.

The code has been divided into articles. Article I., concerns the powers of the Division of Fish and Game of the Department of Conservation. Article II contains the laws concerning licenses, license fees, manner of issuing, application, etc. This article also includes permits. Permits are obtained from the department free of charge. If a charge is made, the authority granted is called a license. Article III concerns game and protective regulations on game. Article IV concerns fish, frogs, and mussels, and protective regulations. Article V concerns the power of the Director of the Division of Fish and Game to suspend, abridge open seasons, and decrease bag limits, or to further regulate methods of taking or killing. Article VI contains general or miscellaneous information.

B. Discussion of Sections.

Discussion of specific sections which are in radical departure from the old law or which are considered in controversy are as follows:

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

LICENSES AND PERMITS.

One of the most important factors in the operation of the Division of Fish and Game is the source of its revenue. A great many people in the state, both those interested directly in conservation work and those interested as tax-payers, do not know that this Division is operated entirely from revenue derived from the sale of various types of licenses. There are some 20 licenses, on which there is a fee, issued from this Division and 10 permits which are issued without charge.

Hunting and Fishing Licenses.

The major portion of the income comes from the sale of the resident hunting, fishing and trapping license. This license, costing \$1.00, is valid for the calendar year in which it is issued. The only residents of the state who indulge in hunting, fishing or trapping and who are exempt from having this license are:

An owner of a farmland, his wife and children, who live with him, may hunt, fish and trap on the land belonging to him;

A bona fide tenant of a farmland and his wife and his minor children, who live with him, may hunt, fish and trap on the land on which he lives;

An ex-service man or nurse who is eligible for the soldiers' free permit;

All persons under eighteen years of age who fish only.
(These persons must have a license if they hunt or trap.)

The Division issues a non-resident annual fishing license. This license, costing \$2.25, is valid for the calendar year in which it is issued and entitles the licensee to fish only in the state.

There is also a non-resident 10 day fishing license. This license for fishing only costs \$1.00 and is valid for ten days, including date of issue.

The non-resident combination hunting, fishing and trapping license costs \$15.50. This license is valid for the calendar year in which it is issued and entitles the licensee to hunt, fish or trap in the entire state.

Archers' Licenses.

For the first time in the history of conservation, this Division will issue a special license to non-residents of the state who use the bow and arrow only when hunting. This license will cost \$2.00 and will be valid for the calendar year in which it is issued.

Any of these licenses, except the archers' license, is available at any of the county clerks' offices in the state and at various sporting goods stores and other like business houses in the state. There is no provision made in the laws for the

issuance of duplicate licenses, either free of charge or at a price less than the original license. The game warden may require anyone who is hunting, fishing or trapping to show his license, so it is necessary for him to have his license with him when indulging in these activities. It is, therefore, necessary for anyone who loses his license or has it destroyed to obtain another license in order to be protected.

Fur-Buyers' Licenses.

The Division of Fish and Game issues several hundreds of licenses each year to persons who buy "raw" fur pelts. The fee for this license for a resident of the state is \$10.00 and for a non-resident of the state, \$100.00. Anyone buying fur in the State of Indiana must have a license, except those agents or employees of a licensed buyer who buy furs in the office or the place of business.

In the past years, there have been many violations of this part of the law which specifies that everyone who buys furs must have a license. In some instances, where a license has been written in the name of a firm, that firm has had fifteen to twenty buyers on the road and all buying fur on the same license. In another instance, where the license was written in the name of two partners, we found that each partner would go on the road to buy fur, both buying on the same license.

In another specific instance a man had his license written in his name with the words "and sons" added. We found that he had four sons, each having a separate business in a separate town, but all five were buying furs on one license.

In order to correct these violations we have made regulations which provide that everyone who buys furs must have a license. A regular application form must be filled out before the license is issued and the license is written in the name of one man only. We feel that we have increased our revenue substantially and put everyone buying furs on an equal basis as far as the license fee is concerned.

Heretofore it has not been necessary for a non-resident of the state, who buys furs from dealers only, to have a license. This provision has been changed by the 1937 Acts and this year a non-resident must have a license, the fee of which is \$100.00. We feel that this larger fee for a non-resident will not only protect all resident buyers, but will especially protect the small resident buyer.

I want especially to call your attention to the fact that a fur-buyer's license will expire on December 31 even though the season does not end until in January. This is a new provision in this law and this is the first year that it has been effective.

At the same time a fur-buyer's license is issued, we issue a card stating that the license has been issued, giving the number and expiration date. We ask the licensee to display this card in his place of business and to carry his license with him at all times that he is buying furs away from his place of business. The fact that the card will not suffice for his license is emphasized. There is also no provision made for the issuance of duplicate licenses in this instance.

The law pertaining to fur-buyers provides for the fur-buyer to make a report to the Division of all the furs bought and sold by him during the season. This report is due not later than 30 days after the last day of the open season for taking or killing fur-bearing animals. The report must be made on forms provided by this Division and must be made in detail. It is necessary to give the name of the person selling the fur, the kind and number of pelts sold and the price paid. It is also necessary for the buyer to give a list of his sales in detail. This report is necessary for several reasons. A careful study of it will enable this Division to judge the increase or decrease in the number of fur-bearing animals in the state. It will enable us to trace stolen furs and especially to trace furs caught out of season. We feel that if every fur-buyer could understand the importance of making a detailed report he would try to give us accurate information.

Lake Michigan Licenses.

The Division receives several hundreds of dollars each year from the sale of commercial fishing licenses for boats and nets used in Lake Michigan. Indiana controls 230 square miles of the waters of Lake Michigan. Anyone fishing in this area must have his boat or equipment licensed. The law provides for a fee of \$1.00 for nets to be used by a resident of the state without a boat or under the ice. The fee for a license for nets used in this manner by a non-resident of the state is \$5.00.

There is a fee of \$5.00 for a boat propelled by oars or sail by a resident of the state. The fee for such a boat for a non-resident of the state is \$10.00. There is a fee of \$10.00 for each power boat of less than 15 tons gross tonnage and owned by a resident of the state. There is a fee of \$25.00 for each power boat over 15 tons gross tonnage and owned by a resident of the state. Non-residents using a power boat of less than ten tons gross tonnage pay a license fee of \$50.00 and for each boat of any kind over ten tons gross tonnage, \$5.00 for each gross ton, not to exceed \$300.00 for any one boat.

The expiration date for commercial fishing licenses is December 31 and the license cannot be duplicated.

Commercial fishermen on Lake Michigan, who fish in Indiana waters, are required to make a monthly report of their catch. Forms for this report are furnished by the Division and ask for a daily recording of all fish caught, together with a detailed report of locations fished and equipment used.

Wabash River Licenses.

The only river in the state in which seines, traps or nets may legally be used is that part of the Wabash River where it forms a boundary line between Indiana and Illinois.

D-nets, hoop-nets, fyke-nets, basket or trap nets, and seines of certain lengths are licensed to be used in the Wabash River where it forms a boundary between Illinois and Indiana. The fee for a seine is \$10.00 for each 100 yards or fraction thereof, to a resident of the state and \$40.25 to a non-resident of the state. D-nets, hoop-nets or fyke-nets are licensed for residents of the state for a fee of \$1.10 and for a non-resident of the state for

a fee of \$4.25. Basket nets or trap nets are licensed to a resident of the state at a cost of 60 cents each and to a non-resident of the state at a cost of \$2.25. Each trap, net or seine must be tagged with a metal tag. These tags are furnished by the Division and are attached by the game warden. When a license of this type is issued it is sent, with the tag, to the game warden. In no instance are the license and tags sent to the licensee. We have followed this procedure for several years in order to assist the game wardens in keeping account of the nets and seines.

A license is issued by the Division for D-nets or hoop-nets to be used in the Wabash River from Lafayette downstream to the state line. The mesh of the net must not be less than $1\frac{1}{2}$ inches wide measured from knot to knot and must not have wings. The fee for this type of net for a resident of the state is \$1.00 and for a non-resident \$5.00. Each net must be licensed and tagged by a metal tag furnished by the Division.

These tags and licenses, also, are sent to the game warden rather than to the licensee.

Wabash River Licenses expire on December 31 of the calendar year in which they are issued and are not transferable and tags cannot be duplicated.

Cisco Licenses.

A new type of license which has been issued during the last two years is called a cisco license. This license is for a gill net to be used in taking cisco from the waters of the state. The fee for the license is \$2.00 and the expiration date for the license is December 31 following date of issue. Two tags are furnished by the Division for each net licensed. Both tags and the license are sent to the game warden who delivers the license to the licensee and affixes the tags to the net. The law also provides that a net licensed as a gill net for taking cisco cannot be more than 150 feet in length or have a mesh of less than $1\frac{1}{4}$ inches. No one person may have more than one net in his possession at any one time.

Mussel Licenses.

Another type of license sold in great numbers is the mussel license. Anyone taking mussels or mussel shells from the waters of the state or buying or selling or shipping mussels or mussel shells that have been taken from the waters of the state must have this license. The fee for a resident of the state is \$2.00 and the fee for a non-resident of the state is \$15.00. These licenses, as all others, expire on December 31 of the calendar year in which they are issued.

We are informed by out of state buyers that hundreds of tons of mussel shells are shipped from the state each year. The market price of shells ranges from \$20.00 to \$60.00 per ton, so this is a most profitable industry for the state. We have no definite figures on the number of shells taken each year. It has been necessary in the past years to exercise the right given this Division by the Legislature and close certain streams against

taking mussels for a period of years. This is done especially in streams which have had the supply of mussels depleted to such an extent that there was danger of complete destruction of them. The only stream closed in the state at the present time is the Salamonie River in Huntington and Wells Counties. This stream was closed on January 1, 1936, for a period of five years.

Game Breeders' Licenses.

The Division receives several hundreds of dollars each year from the fee for game breeders' licenses. This type of license permits residents of the state to have game birds or game animals in captivity during the closed seasons for the purpose of breeding or propagation. Under the regulations of the license, the licensee is required to obtain his stock during the open season in a legal manner or from licensed breeders if he obtains it in the state. If he gets his stock from an out of the state breeder, he is required to show a bill of sale. It is necessary for him to file a formal application for this type of permit on blanks furnished by the Division. The application blanks ask for detailed information regarding the kind, number, and sex of birds or animals held in captivity, where and when they were obtained and where they are being held. When an application of this kind comes into the office it is sent to the game warden. He is asked to make an inspection of the animals or birds held, the manner in which they are cared for and to check on all statements made on the application. I wish to state here that a game warden is not expected to sign these applications automatically and return them. If there is some reason that he would not make a recommendation that the license be issued we want him to tell us, especially stating all the facts pertaining to the case. He may have some information that we do not have and that we should know. When the application is returned to the office by the game warden, the license is issued or refused. The fee for this license is \$5.00 and the license is valid for the calendar year in which it is issued.

Taxidermists' Licenses.

A new license, which the Division is just beginning to issue, is the license for a resident of the state to practice taxidermy. The fee for this license is \$1.00 and the license is valid for the calendar year in which it is written. Under the provisions of this law, any person who holds a taxidermist's license is permitted to possess during the closed season for taxidermy purposes only, any bird or animal or fish or the hide or skin of any bird or animal or fish. Any birds or animals or fish that are not protected may be held at any time without the license.

Ferret Licenses.

The Division issues between 5 and 10 licenses each year for the possession of ferrets. The fee for this permit is \$10.00 for the first ferret and \$5.00 for each additional ferret held in captivity. Nearly every inquiry about ferrets which is received in the office is in regard to using them to catch rats. We have discouraged the use of ferrets for this purpose and have tried to suggest various other methods of ridding a place of rats. It is

impossible to get a ferret shipped in by express without first obtaining a license because the express companies are forbidden by law to surrender the animals unless a license is presented. The major reason for the Division taking the stand against the ferret is because the animals are used in ways that are destructive to game and birds, most especially rabbits.

Scientific Licenses.

One other license is issued by the Division and it is called the scientific license. This license permits the licensee to collect and possess wild birds, their nests and their eggs, wild animals and fish for scientific purposes only. The fee for the license is \$1.00. Before it can be obtained, it is necessary for the applicant to file an application and a bond with the Division. Forms are furnished by the Division for this purpose. Provision is made for recommendations of two scientific men who know the applicant and know his qualifications. The bond is in the sum of \$200.00 and may be either a personal or surety bond. This license is also valid for the calendar year in which it is written.

In conclusion of this synopsis of the various kinds of licenses sold by the Department it is well to note that all of them expire on December 31 of the calendar year in which they are issued, and that it is impossible to obtain duplicates of any one of them. There is no provision made for the issuance of duplicate licenses. Every license is numbered and when our accounts are audited by examiners of the State Board of Accounts, we must account for every license. One other thought that should be emphasized is that no traps or nets or seines are licensed to be used in any of the waters of the state except those licensed to be used in the Wabash River and the licensed gill net to be used for taking cisco. Every other net or trap or seine is illegal and should be immediately confiscated or destroyed.

The Division also issues 10 different kinds of free permits. These are issued under different regulations set up by the Division and all, with one exception, expire on December 31 of the calendar year in which they are written.

Soldiers' Free Permits.

Several thousands of free permits have been issued to eligible ex-service men and army nurses which permit them to hunt, fish and trap in the state without further license. Certain requirements are set out by the law and certain regulations have been established by the Division, which must be complied with to make one eligible for this permit. The law states that an ex-service man who had service in the army, navy or marine corps of the United States during the Civil War, the war with Spain, the Philippine Insurrection, service on the Mexican Border in 1916 and 1917, or in the World War, who has an honorable discharge and who is a resident of the state and has been for six months prior to making application, may obtain this permit. An

army nurse is eligible for this permit under the same regulations. The permits issued are valid just so long as the licensee is a resident of the state.

When making application for this permit it is necessary for the applicant to present an honorable discharge or a certificate issued in lieu of a discharge. I want to emphasize the fact that the discharge must be an honorable one. A discharge without honor or a dishonorable one will not be accepted. This is the only type of permit that is issued by the county clerks under the supervision of the Division of Fish and Game. This permit must be carried by the permittee at all times when he or she is hunting, fishing or trapping.

Pet Permits.

Another type of free permit issued by this Division is called the pet permit. One game bird or one game animal that has been acquired in a legal manner may be held without charge in captivity during the closed season. An animal or bird held under a pet permit cannot be given away, sold or pelted. Any young or eggs from a female animal or bird belong to the Division. An applicant for this type of permit must fill out an application form and an inspection must be made of the animal or bird by a game warden before the permit is granted. Only one pet permit will be granted to one individual in a family. The animal or bird held under a pet permit is subject to confiscation if any regulations of the permit are violated and the permit revoked.

Educational Permit.

The Division is empowered to issue free of charge, a breeder's permit to conservation clubs or educational institutions which will enable them to hold game birds or game animals in captivity for breeding or propagation purposes. Birds or animals held under this type of permit cannot be used in a commercial way. In other words, the birds, the eggs, or the animals cannot be sold but used only for propagation or breeding purposes.

Permit for use of Dynamite.

There are several calls during the year for a permit which will enable the permittee to discharge dynamite or other explosives in the waters of the state. This type of permit is issued free of charge by the Division. Failure to have it when using dynamite or other explosives in the waters of the state subjects the offender to a heavy fine if he is convicted.

Minnow Permit.

Another free permit issued by the Division is the minnow permit. This permit allows the permittee to have in his possession at any one time 500 or more minnows and to sell them. This permit is a regulatory permit especially allowing us to have some idea of the number of people who have minnows for sale and

to know something of their method of taking the minnows. We have consistently refused to issue permits to non-residents of the state hoping to curb the wholesale transportation of minnows out of the state.

Water Vegetation.

The water vegetation permit has been issued during the past two years. It is necessary for anyone obtaining this permit to fill out an application form giving information regarding the kind of water vegetation taken, the method used in taking it, the place it is obtained and the disposal of it. By issuing this permit we are able to judge if any lake or stream is being cleaned entirely of all vegetation so necessary to fish life.

Permit to Owner of Private Pond.

There is also provision made for this Division to issue a free permit to an owner of a private pond or lake which will enable him to use a seine in his pond or lake. Application for this type of permit must be made in writing to the Division. The request is sent to the game warden who makes an inspection of the pond or lake and of the seine. Upon his recommendation the permit is either issued or refused.

Permit for Killing Game.

In order to take care of complaints of damages done by game birds or game animals to crops or gardens, the Division issues a free permit to the owner of the damaged crops or gardens which enables him to kill or capture in closed season, any game bird or game animal, except beaver, which does damage to his property. The Division is empowered to make and investigation of such a complaint and, if justified, may issue the permit. Anyone who kills or captures in closed season, any protected fur-bearing animals, without first having obtained a permit, must make a written report within seventy-two hours to the Division. Failure to make this report makes him subject to a violation of the fish and game laws. Any animal captured during the closed season must be delivered to a representative of the Division.

Field Trial Permits.

A free permit may be issued by the Division to organizations or persons holding field trials. There are separate regulations which will be attached to the permit.

Scientific Permits.

The Division may also issue a free permit to persons enabling them to take and possess migratory birds, their eggs and their nests for propagation purposes only. Certain regulations must be complied with to obtain this permit.

All permits and all licenses are issued at the office of the Division. The soldiers' free permits are also issued by the county clerk in each county and the hunting and fishing licenses are issued by the county clerks and various agents throughout the state. Any license or permit may be revoked at any time without refund for failure to comply with, or for violating any regulations or restrictions under which the license or permit was issued.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

GENERAL

It is always difficult for the men in the field to keep in touch with the office in matters of policy. Policy can be defined as the best method to use in doing our job and is determined by the great mass of information which is collected by the office. Much of this comes from the men in the field, part from interested sportsmen, some from direct contact by our educational division and some from the office personnel. Policy is not determined by what happens in one particular instance or by the facts of any individual case. The one particular case might be the opposite of the rule in the rest of the state. We must guide our actions by a measure of whether or not we are deciding the case in the best interests of the entire state.

Always remember that when any of us are directly touched in our hunting or fishing our powers of reason are likely to suffer partial paralysis. If, when fishing on a lake, another boat comes within what you consider as your particular territory, instead of greeting the other occupant of the boat pleasantly and asking what luck, you feel like casting your anchor in his boat and sinking it or when hunting someone beats you to a likely looking spot of cover, you feel mayhem coming on, you are only feeling normal. The hunting instinct is a powerful factor in the psychology of the normal human being. Our primitive ancestors needed vast areas to hunt and fought savagely to control those areas. It was perfectly natural for the Indians to resent the early settlers. Primitive hunting practices could not but clash with agriculture. Remember, and I can not emphasize it too strongly, that you are dealing with emotions rooted deep in human nature, relating to mother earth herself and to man's feeling that nothing should stand between him and his claims to her bounty. Somehow none of us can reason very clearly when our sport is threatened. In contacting the public always keep that fact in mind.

The work of the warden represents a critical point of contact with the public. A warden intent upon running up a record of arrests and convictions contributes more harm than good in the community. Laws protecting fish and game are highly necessary but they are negative measures, never to be valued above positive and constructive activities. The warden who finds a technical violator accomplishes far more by doing a little missionary work than by yanking the citizen before a justice of the peace. The ideal warden is a man intelligently interested in wildlife, competent in the field, whom sportsmen and others will respect as an authority on questions within his jurisdiction.

In respect to statutes affecting wildlife, it seems sensible to reverse the saying "Ignorance of the law excuses no man". Ignorance of the law may very well be construed as a reflection upon all of us. Our enforcement policy should distinguish clearly between technical and destructive violations. Netting for the market, dynamiting, selling game, etc. should be dealt with differently from those violations which are accidental, casual or of small significance. The warden who hauls the vacationist

into court because of an undersized fish makes a permanent and active enemy of conservation. We know of this kind of enforcement and all of us are glad to know that it is becoming rare. In our state the public's attitude toward the warden has changed radically. It is no longer considered smart to break the law. More and more public sentiment tends toward upholding the fish and game laws.

To the majority of the sportsmen the warden is the Department. When you make a statement of fact that is the attitude of the Department. Do you always know whereof you speak? That is our job, to keep you informed. What do you know about farmer-sportsmen relations and what future policy of the Department should we be planning now? Shall we jump the gun and arrange for paid shooting in Indiana in anticipation of a crowded population and the hunting restricted upon a money basis or shall we strive for the free hunting policy or a modification of it? Will the modern trend to socialization of our natural resources continue to the point of the hunting and fishing being managed for the enjoyment and benefit of all? We consider our first duty to our license buyers and do not encourage any plan which tends to restrict hunting to a few financially able to enjoy it or raise the cost out of proportion to the worth of the sport. You can read many articles written by conservationists upon this subject, many of them based upon facts and conditions which do not apply in Indiana. Our policy is for free hunting and being a part of this Department, that is your policy. We can not preach or advocate different theories and encourage different practices. We must stick together to accomplish what we all want to do for Indiana.

Why do we insist that our game be placed upon land not posted and open to the public? Would you want to pay for the propagation of game and then have it planted behind a tall fence where you could not indulge your instinct to hunt that game? You would not and neither would the men and women who pay your salaries. We must insist that all game be placed upon open territory and all fish be planted in public waters. Our game does not migrate but will stay in favorable habitats until so crowded it is forced out, a condition I have never seen. You are responsible for the proper distribution of the game and fish sent to your territories.

How about our present game laws? Are they the last word and not susceptible to change? Emphatically not, as is evidenced each session of the legislature. Do we know all there is to know about seasons, bag limits, sex ratios, mating and spawning habits, etc? No, and it is the function and duty of the Department to investigate each suggestion and if necessary try those worthwhile. For many years it has been considered that closing the season during the spawning time of fish was the only way to protect the future supply. This Legislature passed an act, approved by the Department, giving Beaver Dam Lake in Kosciusko County an open season on fish the entire year. Spawning beds are to be protected just as long as the fish are spawning. A thorough check will be made of the fish taken from the lake by the owners of the entries on the lake. Why do we approve this? Because if this system allows the reproduction of fish in customary or greater numbers then our supply of fish is not affected and there would

be no objection to having this plan in operation upon all of our lakes. The people in our lake regions asked us to make this experiment and we were glad for the opportunity to enlarge the usefulness and availability of our lakes. Should we have turned down the Kosciusko County Council with the statement that the plan was impossible or did we do the correct thing to give it a trial?

Do you know the attitude of the Department on Education Club Permits? They are issued free to clubs and schools and city parks and to other organizations which are holding different forms of wildlife, not for commercial purposes but for exhibition and education. No birds or animals held under this permit can be sold or otherwise disposed of commercially. We restrict the clubs under this permit to three places to hold their wildlife for the convenience of the warden. The Breeders' Certificates take care of the commercial breeder.

The control of predators is a serious problem in some localities. Many clubs want to enter into this activity whether there is need or not. Undoubtedly there should be some control but the indiscriminate killing of all hawks and owls should be discouraged. Predators become numerous near large concentrations of game and should be controlled. Control by those who can not distinguish between beneficial and harmful species should not be urged. You will probably, at this school, receive instructions concerning the predators and should spread this information in your territory.

In all our contacts with the sportsmen of the state we have consistently tried to approach their problems with an open mind. We have tried to follow their requests recognizing their superior knowledge concerning many of the problems we must meet. We have tried to be tolerant in our relations with the clubs and with individuals. To the best of our ability no single group of sportsmen have been favored to the detriment of the sport of the whole. We recognize that all of us do not indulge in the same form of recreation. It is your duty to see that all sportsmen, whether organized or not, have a chance in the management of our Department; and, by the management of our Department do you realize that I mean exactly that? It has been our policy and will continue to be our policy that we depend upon the sportsman for guidance. I do not and I am sure you do not feel that you hold your job by divine right and thus only responsible to God. None of us are so wise that we do not need advice and counsel. In our work we should follow the wishes and desires of those most interested, the sportsmen and conservationists. Never take the attitude of the "know all". Your mental attitude should be one of cooperation and helpfulness. Never make up your mind without thorough knowledge of the facts in the case. Try to be just in your decisions and preserve always an open mind.

What are the rights of the fisherman on the waters of our state? This question has caused us a lot of trouble and the question is still unsatisfactorily answered. A recent court decision has given the owner of a lake bed the control of the fishing in the water above his property. This is done under the

law of trespass. Previously if the fisherman had not stepped upon the land but floated in a boat upon the water he had the right to fish and was not trespassing. The whole question of riparian rights is a muddle. You should try to uphold the rights of sportsmen to fish in public water unless they are specifically forbidden.

The fish contract and the pheasant contract have been made available to the clubs for several reasons. Of course we want to increase the supply of fish and game because a better supply makes satisfied customers and enable more people to enjoy the two sports. Chiefly our reason was to interest the club members in the fish and game after they have been placed in the rivers, lakes, fields, and woods. No one after carefully tending a pond of fish or a brood of pheasants will stand idly by while they are slaughtered or taken out of season. We have consistently tried to keep these projects from becoming commercialized. We demand that no club pay an outsider more than fifty per cent. of the money received from the Department for raising the fish or furnishing the water area for them. We expect either next year or the year after that to insist that clubs either own their ponds or have them under long term leases upon terms approved by us. We have been generous with the clubs, giving them several years to make enough money to buy or build their ponds and have put ourselves out on a limb time after time to secure W.P.A. projects for the building of rearing ponds, many times in violation of federal regulations. No restrictions are placed upon the hatching of pheasants except that we will not deal with individuals but insist the contract be signed by clubs and the money be paid to the clubs. No birds will be paid for which are not raised under contract. I hope that all of you know that our limit paid to a club is \$500.00 for fish and \$100.00 for pheasants. Nothing we can do will perpetuate the system of conservation clubs we now have as much as having the clubs engage in a permanent project and owning a conservation property. Now is the time to make our clubs permanent and every encouragement should be given to clubs to buy or build rearing ponds or hatching equipment.

What a difference of opinions there is in the Department about the spearing permit. In some counties it is the most worthwhile activity while in other counties and by some wardens spearing by permit is considered a violation of our laws. To measure the good will gained by the Department because of this program would be impossible. It was the opening wedge into the confidence of the people of the lake counties. It is also, in many cases the start of a club in a community formerly resentful of conservation and later developing into a club interested in all phases of conservation. There are bad features of the program, of course, as is the case always but we have gained much and been hurt little. It has been customary among the wardens unfavorable to this activity to emphasize the bad features of the program and forget the good side. Are you working for the Department or are you constituting yourself as the critic and judging the entire state by your particular county or counties? If you do not think the clubs need this privilege in your territory how easy it would be for you to say so and give your reasons and not condemn the entire program.

Do you realize the harm you are doing in talking about our program when you do not know what you are talking about? Many times you can be mistaken even in your own territory. Remember conservation is not just for the godly and the pure but for all of us and the more former violators we enlist in our cause just that much more will we advance our program. Many of our best conservationists formerly had little respect for our Department and our spear-throwing program was our first contact with them. To hear some of you talk all club members are violators which is a mighty poor attitude for any of you to assume.

Do any of you encourage the story of the pheasant and quail not getting along in the same area? Would an employee of a business firm be kept if he knocked his firm's goods? Of course not, and any of you who encourage the belief that pheasants kill quail are ignorant of the true facts and certainly are not loyal to your employer. Support the Department and if you have any suggestions to give give them to us as you certainly have never been ignored at any time.

How many of you ask your minnow dealers for their permits? The purpose of this permit is to give the Department the authority to prevent wholesale waste of our natural supply of fish food. If any dealer of minnows is violating the provisions of his permit, he should be taken out of business and a report made to the office. The same procedure should apply to the holders of vegetation removal permits. Do you ever inspect the property for which a breeders' certificate is issued unless requested to do so from the office? Keep in touch with the activities of the Department. There have been instances of men asking for breeders' certificates and stating in their applications that they have had the animals or birds for a year or more. You should know about these things in your territory.

You should contact the farmers, stop at their homes, become acquainted and build up a feeling of good will for the Department. Try to meet at least one new farmer each day for a period of six months and see how your territory responds in conservation activities during that time. Do not do all of your patrolling in your car. You need exercise of both body and mind and you can get both by patrolling on foot and meeting new people. Tell them what we are trying to do, ask them for their help and offer your services to them any time they need you.

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
TRAINING SCHOOL

THE FOLLOWING TERMS AS USED IN THE LAW ARE
INTERPRETED BY THE DIRECTOR OF THE
FISH AND GAME DIVISION AS FOLLOWS:

ANGLING: The art of taking or attempting to take fish by means of a line held in the hand or fastened to a pole or reel at one end and bearing not more than two (2) hooks or artificial baits at the other end.

POLE AND LINE OR ROD AND LINE A line bearing not more than two (2) fish hooks or artificial baits at one end and fastened to a slender pole or rod at the other end.

HOOK AND LINE A line bearing not more than two (2) fish hooks fastened to one end and held in the hand or fastened to a pole or rod at the other end.

ROD AND REEL A kind of small windlass fastened on the butt portion of a rod or pole in a manner to permit the winding up or letting out of a line through guides fixed at intervals to the rod or pole.

TROT LINE A stout line with one or both ends fastened to a fixed object and bearing three (3) or more fish hooks hung at intervals to the main line by short lines.

SET LINE A stout line with one or both ends fastened to a fixed object and bearing three (3) or more fish hooks fastened directly to the line.

THROW LINE A set line, a trot line, or a hook and line having three or more hooks and bearing a weight of sufficient size to permit one end of the line to be thrown into the water and having the other end of the line held in the hand or fastened to a stationary object.

PITCHFORK The term pitchfork is construed to mean a pitchfork in its ordinary sense and one that has not been altered in such a way that it can not be used for the purpose for which it was originally intended.

GAFF HOOK OR A GAFF An implement of metal or other hard or tough material formed or bent into a curve with or without barbs, having a shank with or without a handle and being of sufficient size to permit its being held in the hand for seizing, holding or sustaining fish.

GRAPPLING HOOK A grapnel or an implement of metal or other hard or tough material with two or more flukes or claws with or without barbs and affixed to a central shank in the fashion of a treble hook.

GRAB HOOK Any device or implement which may be used as a tong either automatically or semi-automatically and used to clutch or close down on or suddenly grasp fish.

Publications on Many Subjects Are Issued by Department of Conservation

Many publications of historical and geological interest to Indiana students are issued by the Department of Conservation and may be obtained by addressing the division under which they are listed. The majority of these are available without charge while a small charge covering the cost of publication is made for some. Unless the cost is indicated after the title of the following list, it is free.

In some cases the Department has but a small number of these publications available and cannot guarantee that all requests will be filled.

ENTOMOLOGY

Chinch Bug Manual.
Cat and Dog Fleas.
Revision of Horticulture and Bee Laws.
European Corn Borer.
Corn Borer Regulations.
Some Insect Pests and Plant Diseases in Indiana.
Brood Diseases of Bees in Indiana and their Control.

FORESTRY

Trees of Indiana. \$1.25.
Assessment of Forest Lands.
Shrubs of Indiana. \$1.75.
Planting Forest Trees in Indiana.
Grasses of Indiana. \$2.00.
Instructions on Planting Tree Seed.
Proceedings of Forestry Congress of Central States.

STATE PARKS, LANDS AND WATERS

Turkey Run Booklet (Revised). 25c.
McCormick's Creek State Park Booklet. 25c.
Trail Map of Turkey Run State Park.
Trail Map of Clifty Falls State Park.
Clifty Falls State Park Booklet. 25c.
James F. D. Lanier Home Booklet. 25c.
Pokagon State Park Booklet. 25c.
McCormick's Creek Canyon Trail Map.
Trail Map of Indiana Dunes State Park.
The Corydon State House. 25c.
Spring Mill State Park Booklet. 25c.
Shakamak State Park Booklet. 5c.
Mounds State Park Booklet. 5c.
State Parks, an illustrated booklet giving a short description of state parks and memorials.
Mounds Trail Map.
Pokagon State Park Trail Map.
Colored Illustrative Historical Map of Indiana. 50c.
Indian Trail Map of Indiana. 50c.
Brown County Trail Map.
Dunes State Park Booklet. 25c.
Spring Mill Trail Map.

FISH AND GAME

Manual of Game Warden Service, revised. (For Wardens Only.)
Survey of Lake Maxinkuckee (2 volumes). \$1.00 plus postage.
Fish and Game Law Summary (1934).
Propagation of Pheasants and Quail—Cottingham.
Hatcheries and Rearing Ponds for Bass and Sunfish—Andrews.

GEOLOGY

Indiana Kaolin.
Handbook of Indiana Geology. Residents \$3.00, Non-residents \$5.00.
Geological Conditions in Oil Fields of Southwest Indiana. Residents 50c, Non-residents 75c.
Laws and Regulations Affecting Oil and Gas Operations in Indiana.
Geology of the Deep Wells of Indiana. 50c.
Geology of the Silurian Rocks of Northern Indiana. Paper bound \$1.00, Cloth \$1.25.

Map—Monroe County Region of Indiana Oolitic Limestone. 75c.
Map—Lawrence County Region of Indiana Oolitic Limestone. 75c.
Geologic History of the Vertebrates of Indiana. Cloth \$1.25, Paper \$1.00.
Ceramic Materials of Indiana.
The Borden (Knobstone) Rocks of Southern Indiana. Cloth \$1.50, Paper \$1.25.
Insoluble Residue Studies of Mississippian Limestone in Indiana. 25c.
Sub-Surface Strata of Indiana. Cloth \$1.50, Paper \$1.25.
Geological Map of Indiana. Residents \$1.25, Non-residents \$1.50.
Clay Resources of Indiana. Cloth \$1.25, Paper \$1.00.
Surface Water Supply of Indiana.—Engineering.
2nd (1870) Geology and Coals of Sullivan, Knox, Daviess, Martin, Dubois, Pike, Gibson, Warrick, and Spencer Counties; Flora of Jefferson County. \$3.00.
7th (1875) Geology of Ripley, Jennings, Orange, Vanderburgh, Owen, Vigo, Montgomery, Huntington, Clay, and Putnam Counties; Coal Analysis; Hydrographic Survey; Flora of Lower Wabash Valley. \$2.00.
17th (1891) Building Stones; Geology of Steuben, Whitley, Carroll, and Wabash Counties; Petroleum and Natural Gas; Butterflies of Indiana; Batrachians and Reptiles of Indiana. Free.
18th (1893) Geology of Noble and Lagrange Counties; Structural Features of Indiana; Paleontology. \$3.00.
21st (1896) Petroleum Industry; New Albany Shale; Indiana Caves and their Fauna; Silurian Rocks of Indiana; Bedford Oolitic Limestone; Geology and Botany of Vigo County. \$2.50.
22nd (1897) Geology of Lake and Porter Counties; Clays and Clay Industries of Northwestern Indiana; Niagara Limestone Quarries; Catalogue of Indiana Fossils; Birds of Indiana. \$10.00.
23rd (1898) Coal Deposits of Indiana. \$10.00.
24th (1899) Middle Silurian Rocks; Waldron Shale; Dragonflies of Indiana; Mollusca of Indiana; Batrachians and Reptiles of Vigo County; Flowering Plants and Ferns of Indiana. \$1.00.
25th (1900) Lakes and Marl Deposits of Northern Indiana; Silver Creek Hydraulic Limestone; Devonian Fossils and Stratigraphy. \$2.00.
26th and 27th (1901-2) Mineral Waters of Indiana; Geologic Section Across Southern Indiana; Gold and Diamonds in Indiana; Lower Carboniferous Geology; Orthoptera of Indiana; Mollusca of Indiana.
28th (1903) Lime Industry in 1903; Physiography and Ecology of the Winona Lake Region; Niagara Rocks of Northern Indiana. \$2.00.
30th (1905) Roads and Road Materials of Indiana; Fauna of the Salem Limestone. \$3.00.
40th (1915) Glacial History of Indiana; Soil Surveys of Northern Counties; Geology of Dearborn, Jefferson, and Greene Counties. Free.
41st (1916) Dunes of Northwestern Indiana; Soil Surveys of Northern Counties; the Beautiful Shades; McCormick's Creek Canyon. Free.
Topographic Maps of Quadrangle, mapped by U. S. G. S. 10c.
Ground Water in Indiana. \$1.50.
Indiana Pipe Line Map. 25c.
Oil and Gas Development in 1934. 25c.
Oil and Gas Development in 1935. 25c.

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The Old Fisherman Mixes Angling With Flowers and Becomes Poetic

Envies the Botanist But Goes Ahead and Names Plants to Suit Himself—Thinks Spring Beauty Is Overdone

Now, Mr. Editor, don't get mad at me because I'm going poetic. But I jest thought maybe you'd want to know something about what an old fisherman thinks about when he's out in the woods and along the streams and up in the hills. What I'm a thinking is that all the folks get out right about this time of year but they make a whale of a mistake in not keeping it up. All of the writing and poetry and even the music kinda leave an impression that all the flowers bloom in the spring. I got to thinking about it and that's what got me started to writing this.

You can take them there botanists. Boy, I'm plumb jealous of them. I've been around when some of them was present and the way they talked was astonishing. Once I was walking through a pasture field with one of them guys right after we'd been sitting on a river bank fishing for suckers with worms. He had a funny way about him; he'd stick out his foot and wave it around and point with it and say: "This is so-and-so, and this over here is 'tother." And he'd be reeling off big names and talking about families and other things till I didn't know anything about what he was saying. Fact is, I got all fuddled up and confused before he got started. That makes me jealous. I'd like to keep up with them and know what it's all about, but somehow I jest hain't qualified.

So I went 'em all one better and won the bet. I have my own names for all the flowers I don't know. My names hain't found in the books, but they are good names at that. You can take winter-blooming-astonishment for example—boy, that's a better name than you can find in all the books for it, but I'm getting ahead of myself and'll tell you more about it later on.

Take these spring flowers. Everybody says they are beautiful and they are. There's Johnny-jump-ups, sweet Williams, Jack-in-the-pulpits and lamb's tongue. I like them. They all come out about the time suckers are biting in the creeks. Catfish, too.

There's dandelions, which are the most beautiful of them all, only we've got so many of them we don't appreciate them. You can take a dandelion and pick it to pieces, and count all the petals and roots and leaves and other things you find on it, and you begin to wonder at how complicated nature is, and how beautiful. Then, if you think only of your stomach, dandelions are good to eat. You can take the light-colored, tender ones that grow partly smothered, and they are tender and good when cooked with ham bone

and—but why bring that up? Some time I reckon gardeners will have sense enough to raise tender dandelions in the shade—but that's not flowers, is it?

Funny thing about it is that these folks get all pepped up and out doors in the spring and pick flowers that ought to be left on the plant, and then let the flowers wilt and forget all about them. If they only knew what they miss!

Now you can traipse up around Tippecanoe Lake in late August and you'll see something that's better than all the flowers of spring. Over on the south side of the narrows at the east end of the lake is a marsh that is jest full of reach-up-and-show-yourself. I tried to look this flower up in the books and it is something like this, "hibiscus militaris"—or something. Anyhow I guess it really is one kind of hibiscus.

The first time I saw this flower growing I was trying to find a place where I could cast a fly for bass. In the distance I saw the color shining like a field of wild roses. There was a botanist with me then—same fellow that pointed out the plants with his foot. He looked kinda funny when I told him to look at the wild roses, and told me he reckoned they were hibiscus. I reckon he's right. Anyhow the things are not wild roses, because we rowed over there and I laid off of fishing to look at these five-petaled, rose-colored flowers, nearly as the crown of my hat. And when I quit fishing to look at a flower—boy, that's something.

Well, I got to looking for something besides rising bass after that, and I found this darned stuff growing around the Barbees and all up and down that channel to Lake Tippecanoe, and I even found it in a spot or two along the Wabash. This wild-growing hibiscus is exactly 17½ times as pretty as the blue kinds you raise in a flower garden, but if you print this I'll have all the greenhouse folks on my neck.

Now don't get mad. I'm not looking for an argument and if you disagree with me, you are right. But jest the same, the point is like this: If you quit looking for beauties of nature when the Jack-in-the-pulpit is gone, you're missing most of the show.

This hibiscus is beautiful, but you don't get the whole show in August—not by a jugful, as mother used to say. Along comes October and there is still some bittersweet to look at. If I go home and tell my wife about it, she always wants to know why I didn't pick some for her, because it makes nice winter bouquets. But I'm agin picking it. I can't tell you jest why, but I am. Somehow (Continued on page 8)

- b) centerline.
10. Do not cross the yellow line.
11. When driving on three or four lane pavement use the outer lane. The other lane is to be used for passing only.
12. Do not try to drive when extremely tired or sleepy.



1937

OFFICIAL
STATE HIGHWAY MAP
INDIANA

Issued by
STATE HIGHWAY COMMISSION

Fish and Game Laws Recodified by Indiana General Assembly

ARTICLE I. POWERS AND DUTIES OF THE DIRECTOR AND GAME WARDENS.

Section 1. Be it enacted by the General Assembly of the State of Indiana, That the chief administrative officer of the Division of Fish and Game of the Department of Conservation, now known and designated as the superintendent of fisheries and game, shall be hereafter known and designated as the Director of the Division of Fish and Game of the Department of Conservation, and shall be appointed and receive a salary as now provided by law. He shall have the power and it shall be his duty to enforce the provisions of this act, and any and all laws of this state now in force or hereafter enacted for the propagation or protection of game, fur-bearing animals, birds, frogs, mussels, or fish.

Sec. 2. There shall be appointed, as now provided by law, officers to be known and designated as Game Wardens, and it shall be their duty to assist the Director of the Division of Fish and Game of the Department of Conservation in the enforcement of and to enforce the provisions of this act, and to enforce all other laws of the State of Indiana for the propagation or protection of game, fur-bearing animals, birds, frogs, mussels, or fish, now in force or hereafter enacted, under the direction and supervision of the Director. The Director is hereby authorized to appoint such non-salaried Deputy Game Wardens as he shall deem necessary. Such Deputy Game Wardens shall have the same power, duty, and authority as may be conferred by law on Game Wardens, except that they shall serve without remuneration and at the pleasure of the Director.

Sec. 3. The Director shall prescribe and furnish to any Game Warden or Deputy Game Warden appointed, under the provisions of this act or as now provided by law, a certificate showing such officer's appointment, the term thereof, and his authority to act as a Game Warden or Deputy Game Warden. Such certificate, duly signed and executed, shall be received by any Justice of the Peace, criminal, municipal, or circuit court as conclusive evidence of such officer's appointment.

Sec. 4. The Director, Game Wardens, and Deputy Game Wardens shall have the authority to arrest, without writ, rule, order, or process, any person in the act of committing or attempting to commit any crime or misdemeanor in violation of any provision of this act or any and all laws of this state for the propagation or protection of game, wild animals, wild birds, frogs, mussels, or fish, now in force or hereafter enacted, and they are hereby made peace officers of this state for that purpose, with all the power, duty, and authority conferred by law.

Sec. 5. The Director, Game Wardens, and Deputy Game Wardens shall have the power and authority to search any boat, conveyance, vehicle, automobile, fish-box, fish-basket, game bag, game coat, or any receptacle in which game may be carried, and may enter into or upon any private or public property for such purposes or for the purpose of patrolling or investigating when he has good reason to believe that he will secure evidence of a violation of any of the laws for the propagation or protection of fish, frogs, mussels, game, fur-bearing animals, or birds, now in force or hereafter enacted, or any of the provisions of this act. Public or private property shall not include dwellings or dwelling houses.

Sec. 6. (a) The Director, Game Wardens, and Deputy Game Wardens shall at any and all times seize and take possession of, without a warrant, any and all wild birds, wild animals, hides or furs of fur-bearing animals, frogs, mussels, mussel shells, or fish which have been caught, taken, killed, or had in possession or under control, or had for shipment or transportation by any person contrary to or in violation of any of the provisions of this act, and, upon conviction of any such person of having caught, taken, killed, possessed, or had for shipment or transportation any wild bird, wild animal, hides or fur of fur-bearing animal, frogs, mussels, mussel shells, or fish in violation of any of the provisions of this act, all such wild birds, wild animals, hides or fur of fur-bearing animals, frogs, mussels, mussel shells or fish so caught, taken, killed, possessed, or had for shipment or transportation shall be forfeited to this state, and confiscated in the name of the state, and shall be disposed of as the Director shall direct.

(b) The Director, Game Wardens, and Deputy Game Wardens shall at any and all times seize and take possession of, without warrant, any and all nets, seines, spears, traps, or any other hunting, trapping, musseling or fishing appliances, apparatus, or devices used or possessed by any person in violation of any of the provisions of this act, or of any other law of this state now in force or hereafter enacted, and, upon conviction of such person of having violated any provision of this act or any such other law,

such net, seine, spear, trap, or any and all other hunting, trapping, or fishing appliances or apparatus or devices, whatsoever, shall be forfeited to the state and confiscated in the name of this state, and disposed of as directed by the Director.

Sec. 7. The Director, Game Wardens, and Deputy Game Wardens hereby are authorized and empowered to execute and serve any place in this state all warrants and processes issued by any Justice of Peace or any Court having jurisdiction under any of the provisions of this act, or under any provisions of any act which the Director has the duty to enforce.

Sec. 8. Justices of the Peace may issue warrants to search any house or place for seines, fishing-nets, fishing-traps, fish-spears, or for any implement or device used or kept for use for taking fish, frogs, mussels, or game unlawfully, or for any wild birds, wild animals, frogs, mussels, or fish, or part thereof, the possession of which shall at the time be unlawful. Search warrants, affidavits therefor, and all procedure concerning search warrants shall be in form and substance as now provided by law for search warrants and issuance thereof in other cases.

Sec. 9. It shall be unlawful for any person to obstruct, hinder, or interfere with the Director, any Game Warden, or Deputy Game Warden, or any regularly appointed employee or agent of the Division of Fish and Game of the Department of Conservation in lawful discharge of his duty in the enforcement of this act. Any person who shall violate any provision of this section shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not less than twenty-five (\$25.00) dollars or more than two hundred fifty (\$250.00) dollars, to which may be added imprisonment for not more than sixty (60) days.

ARTICLE II. LICENSES—PERMITS.

PART I. HUNTING, TRAPPING, AND FISHING LICENSES.

Sec. 10. It shall be unlawful for any person to fish in, or take, catch, or attempt to take or catch, any fish from the waters of this state, or to hunt, shoot, take, pursue, or trap any wild bird or wild animal in this state, without first procuring a license therefor, as in this act provided, unless such person shall be by this act specifically exempt from so doing.

Sec. 11. All hunting, trapping, and fishing licenses shall be issued by the Director, by agents duly appointed by him, and by the clerk of the circuit court in each county of this state. All such licenses shall be in the form prescribed by the Director, and if issued by a clerk or agent, shall be countersigned by such clerk or agent. Clerks or agents shall be furnished with all necessary blank license forms; and a certificate, showing authority to issue such licenses, shall be furnished to duly appointed agents. All hunting, fishing, and trapping licenses issued under provisions of this act shall expire on the 31st day of December next following the date of issue.

Sec. 12. The Director, his duly authorized agents, and clerks of the circuit courts of the respective counties in this state are hereby authorized to issue the following licenses to hunt, trap, or fish in this state, under such regulations or restrictions in this act provided or as may hereafter be provided by law, upon the payment of the following respective license fees for the same:

(a) A resident yearly license to hunt, trap, and fish, \$1.50, except that the fee for any resident yearly license to hunt, trap, and fish issued during the calendar year of 1937 shall be \$1.00.

(b) A nonresident yearly license to hunt, trap, and fish, \$15.50.

(c) A nonresident license to fish only, for ten consecutive days only, \$1.00.

(d) A nonresident yearly license to fish only, \$2.25.

Sec. 13. (a) Each and every clerk and agent duly authorized to issue licenses under the provisions of this act shall retain out of the license monies collected for the sale of each license issued by him the following fees:

For each nonresident yearly fishing license issued, the sum of twenty-five cents (25c).

For each resident yearly hunting, trapping, and fishing license issued, the sum of ten cents (10c).

For each nonresident ten consecutive days fishing license issued, ten cents (10c).

For each nonresident yearly hunting, trapping, and fishing license issued, fifty cents (50c).

(b) Each clerk or agent issuing licenses under provisions

FISH AND GAME LAWS RECODIFIED

of this act shall report to the Director on the first day of each month the number of each respective kind of licenses issued by him during the preceding month, the serial numbers thereof, the names of the respective licensees, and the number of blank licenses of each kind remaining in his possession, and each clerk and agent at that time shall remit all monies collected for such licenses, except that duly authorized clerks and agents in each county may retain from such monies the fees due him for licenses issued and sold by him as provided in this section.

(c) Each agent authorized to issue licenses hereunder shall execute a bond payable to the State of Indiana in such amount and with such surety as shall be approved by the Director, conditioned for the proper issuance of such licenses and proper accounting for all monies due to the state therefor.

(d) All monies received into the hands of the Director from the sale of licenses shall be deposited in the state treasury as a part of the fish and game protection and propagation fund.

Sec. 14. (a) Any owner of farmland who is a resident of this state, the spouse and children living with such owner may fish, hunt and trap on any land belonging to such owner without a license.

(b) A bona fide tenant of farmland, and the spouse and children living with such tenant may fish, hunt, and trap without a license on the farm only, upon which he resides.

(c) Any person having served as a soldier, sailor, marine, or nurse in the army, navy, or marine corps of the United States during the Civil War, the war with Spain, the Philippine insurrection, the service on the Mexican border during the year 1916 or 1917, or the World War, and having an honorable discharge from such service may hunt, trap, or fish without a license provided such person first obtains a free permit therefor as provided in this act.

(d) All persons under eighteen years of age may fish without a license, but such person must have a license to hunt or trap, as other persons.

(e) The exemptions provided in this section shall not apply to any commercial license issued under the provisions of this act.

Sec. 15. The Director is hereby authorized to issue to any nonresident of this state an archer's license upon the payment of a fee of \$2.00.

Such license shall authorize the licensee to hunt, shoot, or kill, with bow and arrow, wild animals and wild birds in this state, subject to provisions of this act and under such regulations as the Director shall prescribe for such hunting or shooting. It shall be unlawful for any person having procured a nonresident archer's license to have, use, or possess in this state, while in the act of hunting, any firearm unless such person shall have procured under the provisions of this act a nonresident hunting license authorizing the hunting and shooting with such firearms.

PART II. FUR BUYER'S LICENSE.

Sec. 16. It shall be unlawful for any person, firm, or corporation to engage in the business of buying fur-bearing animals or the untanned hides or furs thereof in this state without first procuring a license therefor, as in this act provided.

Sec. 17. Any person, firm, or corporation who desires to engage in or to continue in the business of buying fur-bearing animals or buying untanned hides, skins, or furs of fur-bearing animals in this state shall file an application with the Director for a license to do so, and shall submit with such application the fee which is hereinafter prescribed in this act. The application shall be on a form prescribed and furnished by the Director. Upon receipt of an application containing the proper requisite information and the prescribed fee the Director may issue to the applicant a license so applied for, which shall expire on December 31st next after the date of issue. Any license so issued to a person, firm, or corporation shall entitle such person, firm, or corporation to purchase fur-bearing animals or the untanned hides, skins, or furs thereof only at one office or place of business under such license: Provided that the agents or employees of any person, firm, or corporation who is duly licensed under this act shall be exempt from procuring a license to purchase fur-bearing animals or the untanned hides, skins, or furs thereof at the office or place of business of such person, firm, or corporation for which the license was issued.

Sec. 18. (a) The Director is hereby authorized to issue to any person, firm, or corporation a license to engage in the business of buying fur-bearing animals or the untanned hides, skins, and furs thereof in this state during the open season thereon, upon the payment of the following fees: For a resident buyer's license, ten dollars (\$10.00); for a nonresident buyer's license, one hundred dollars (\$100.00).

(b) The Director is hereby authorized to prescribe such rules and regulations as he may deem necessary to discourage the taking of fur-bearing animals during the closed season thereon. Such rules and regulations, when incorporated in or attached to the fur-buyer's license when issued, shall have the force and effect of law, and it shall be unlawful for any fur buyer to violate any rule and regulation prescribed in the license obtained by him under the provisions of this act. Such license shall be revoked by the Director upon satisfactory evidence that the licensee has violated the provision of his license.

Sec. 19. As used in this act: (a) A buyer of hides, skins or furs of fur-bearing animals shall be construed to mean and include any person, firm, or corporation who purchases or solicits the purchase of any fur-bearing animal, or the untanned hide or fur thereof, whether in his own behalf or agent for another except as in Section 17 of this act otherwise provided.

(b) The term "fur-bearing animals" shall be construed to mean and include raccoons, opossums, minks, skunks, muskrats and red foxes.

Sec. 20. Every fur buyer licensed under this act shall, within thirty (30) days from the last day of the open season for taking or killing fur-bearing animals, make a report in writing to the Director of all purchases of fur, the person or persons from whom purchased, the date of purchase, the price paid and the person, firm, or corporation to whom sold, and the date of sale.

PART III. COMMERCIAL FISHING AND MUSSEL LICENSES.

Sec. 21. It shall be unlawful for any person, firm or corporation to take any fish from the waters of Lake Michigan within the jurisdiction of this state with or by means of a boat, tug, launch, net, nets, or other commercial fishing gear without first procuring and at the time having a license therefor as in this act provided.

Sec. 22. All licenses for taking fish from the waters of Lake Michigan within the jurisdiction of this state by means of commercial fishing gear shall be in the form prescribed and issued by the Director and shall be issued upon the payment of the following respective fees:

(a) For residents of this state: For the use of one or more nets of any kind without a boat, or under the ice, one dollar; for each sailboat or rowboat propelled by oars or sail, five dollars; for each power boat propelled by steam, gasoline, naphtha, electricity or other motive power of less than fifteen tons gross tonnage, ten dollars; for each boat of any kind over fifteen tons gross tonnage, twenty-five dollars.

(b) For nonresidents of this state: For the use of one or more nets of any kind without a boat, or under the ice, five dollars; for each sailboat or rowboat propelled by oars or sail, ten dollars; for each power boat propelled by steam, gasoline, naphtha, electricity or other motive power of less than ten tons gross tonnage, fifty dollars; for each boat of any kind over ten tons gross tonnage, five dollars for each gross ton, not to exceed, however, three hundred dollars for any one boat. For the purpose of this act the computation of gross tonnage shall be made as registered by the United States Government.

Sec. 23. All licenses issued under this act authorizing the taking of any fish from the waters of Lake Michigan within the jurisdiction of this state with or by means of any boat, tug, launch, net, nets or other commercial fishing gear shall expire on the 31st day of December next following the date of issue. They shall not be transferable or assignable, except that the Director, upon application therefor, may permit the temporary transfer of such license to any similar boat during such period of time as the licensed boat is disabled and undergoing repairs. It shall be unlawful for any person to change, alter, forge, or counterfeit any such license. Each license issued hereunder shall be subject to the provisions of this act, and of any act hereafter in force for the protection of fish in Lake Michigan within the jurisdiction of this state, and such licensee may take such fish during the respective seasons only when it shall be lawful to do so, and in a lawful manner only. Every such license shall be issued upon the express condition, to which condition the licensee, by the acceptance of the license, shall be deemed to agree and consent, that the licensee shall make reports to the Director as hereinafter provided in this act. Any such license may be revoked at any time by the Director for failure to comply with or for violation of the terms of such license or of this act, or orders or regulations issued and promulgated pursuant to this act.

Sec. 24. The Director is hereby authorized to issue to any person a license to use in, and to possess for use in, the Wabash River where it forms a common boundary between the states of Indiana and Illinois, such seines, hoop-nets, fyke-nets, basket-nets, or trap-nets as may conform with the restrictions and regulations of this act made and provided, upon payment of the fee provided therefor according to the following schedule:

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For residents of Indiana:

Seines, \$10.00 for each 100 yards or fraction thereof.

For each dip-net, hoop-net, or fyke-net, \$1.10.

For each basket-net or trap-net, 60c.

For nonresidents of Indiana:

Seines, \$40.25 for each 100 yards or fraction thereof.

For each dip-net, hoop-net, or fyke-net, \$4.25.

For each basket-net, or trap-net, \$2.25.

The director shall prescribe and cause to be affixed to each seine, net, or trap licensed under this section, a tag or seal that will identify the net, to which affixed, with the license issued therefor. All licenses authorized and issued under the requirements of this section shall expire on the 31st day of December next following the date of issue.

Sec. 25. The Director is hereby authorized to issue to any person a license to use in, and possess for use in, that part of the Wabash River which lies in this state and extends from the corporate limits of the city of Lafayette to the place where the western boundary line of the State of Indiana intersects the Wabash River, a D-net or hoop-net made of twine or cord having a minimum width of mesh of $1\frac{1}{2}$ inches, measured from knot to knot, and having no wings, as may conform with the regulations and restrictions of this act made and provided, upon payment of the fee required therefor according to the following schedule of fees:

For residents, per net, \$1.00.

For nonresidents, per net, \$5.00.

The Director shall prescribe and cause to be attached to each net licensed under this section a tag or seal that will identify the net to which affixed with the license issued therefor. All licenses authorized and issued under the provisions of this section shall expire on the 31st day of December next following the date of issue.

Sec. 26. (a) The Director is hereby authorized to issue, upon payment of a fee of two (\$2.00) dollars, a license to possess and use, under the rules and regulations in this act provided, a gill-net for taking cisco from the waters of this state.

(b) The Director shall prescribe and furnish tags or seals which he shall cause to be affixed to each net licensed under this section.

(c) All licenses authorized and issued under this section shall expire on the 31st day of December next following the date of issue.

(d) Any gill-net licensed under the provisions of this act shall not exceed one hundred fifty (150) feet in length, nor be of a mesh less than one and one-fourth ($1\frac{1}{4}$) inches, measured from knot to knot, nor shall any person use or have in his possession more than one of such nets at any one time.

Sec. 27. It shall be unlawful for any person to take or catch, or attempt to take or catch, mussels or mussel shells from the waters of this state, or ship, or offer to sell, buy or offer to buy mussels or mussel shells taken from the waters of this state without first procuring a license therefor, as in this act provided.

Sec. 28. (a) The Director is hereby authorized to issue to any resident of this state, upon payment of two (\$2.00) dollars, a license to take, or catch mussels or mussel shells from the waters of this state, and to ship, sell, or buy mussels or mussel shells taken from the waters of this state, under the rules and regulations in this act provided, or under such regulations as he shall deem necessary for the protection of mussels.

(b) The Director is hereby authorized to issue to any non-resident of the State of Indiana, upon payment of the sum of fifteen (\$15.00) dollars, a license to take, or catch mussels or mussel shells from the waters of this state, and to ship, sell or buy mussels or mussel shells taken from the waters of this state under the rules and regulations in this act provided, or under such regulations as he shall deem necessary for the protection of mussels.

PART IV. GAME BREEDERS, TAXIDERMISTS, SCIENTIFIC, FERRET LICENSES.

Sec. 29. (a) The Director is hereby authorized to issue to any person, upon the payment of five (\$5.00) dollars, a license to propagate in captivity, and to possess, buy or sell for such purposes only, game birds, game animals, or fur-bearing animals protected by any law of this state, under such regulations and restrictions as in this act made and provided, or as may be prescribed by the Director.

(b) Licenses issued under the provisions of this section shall authorize the sale of game birds, game animals, or fur-bearing animals for breeding purposes or for release. Any person who acquires any game bird, game animal, or fur-bearing animal, alive, legally in open season, or purchases the same from a

licensed game breeder, may make application for a breeder's license within five days after acquiring such game bird, game animal, or fur-bearing animal from such licensed game breeder or within five days after the last day of the open season for such game bird, game animal, or fur-bearing animal, otherwise such game bird, game animal, or fur-bearing animal must be released.

(c) Any licensed game breeder may kill, pelt, and sell any fur-bearing animal held under a valid license during the open season therefor. It shall be unlawful to kill, pelt, or sell such animals during the closed season therefor unless the licensee first gives written notice to the Director.

Sec. 30. (a) The Director is hereby authorized to issue to any person a license to possess for taxidermy purposes any wild bird, wild animal, fish, or the hide or skin thereof protected by any law of this state, during the closed season therefor, under such rules and regulations as he shall prescribe.

(b) The Director shall charge and collect a fee of one (\$1.00) dollar for each license so issued, and such license shall expire on December 31st next after the date of issue.

(c) Wild birds, wild animals, and fish not protected by any law of this state may be had and possessed for taxidermy purposes by any person without a license.

(d) Wild birds, wild animals, and fish lawfully taken in open season and mounted may be had and possessed by any person at any time.

Sec. 31. The Director is hereby authorized to issue to a properly accredited person a license authorizing such person to collect and possess wild birds, their nests and eggs, wild animals, or fish for strictly scientific purposes in this state, under such regulations and restrictions as he shall prescribe. The applicant for such a license must present to the Director written testimonials of two well-known scientific men, certifying to the character, academic and scientific accomplishments, and fitness of such applicant, together with one (\$1.00) dollar, and a properly executed bond in the sum of two hundred (\$200.00) dollars, payable to the State of Indiana, conditioned that such applicant will obey the terms of such license, signed by at least two responsible citizens of this state as sureties. The bond may be forfeited and the license revoked upon proof to the satisfaction of the Director that the licensee has killed any wild bird or animal, or taken the nest or eggs of any bird for any other purpose than that authorized in this section.

Sec. 32. (a) It shall be unlawful for any person to harbor or have in his possession any ferret or ferrets in this state without first procuring a license therefor from the Director, as in this act provided.

(b) The Director is hereby authorized to issue to any person a license to possess and harbor ferrets, upon the payment of ten (\$10.00) dollars for the first ferret, and five (\$5.00) dollars for each additional ferret harbored or possessed, and under such rules and regulations as he shall prescribe.

(c) It shall be unlawful for any person, firm, or corporation to deliver any ferret to any other person, firm, or corporation in this state without first having notified the Director of the name and address of the person to whom delivery is intended; and it shall be unlawful for any person, firm, or corporation to deliver any ferret to any other person, firm, or corporation unless the person, firm, or corporation to whom such ferret is delivered shall have a license issued by the Director, as provided in this act.

PART V. FREE PERMITS.

Sec. 33. (a) The Director is hereby authorized and required to prescribe and furnish free permits to hunt, trap, and fish in this state to honorably discharged soldiers, sailors, marines, and nurses who served in the army, navy, or marine corps of the United States during the Civil War, the war with Spain, the Philippine Insurrection, the service on the Mexican border during 1916 or 1917, or the World War, who are at the time of application for such permit and who have been for a full period of six months next preceding the date of application bona fide residents of this state.

(b) The form of such permits and applications therefor shall be prescribed by the Director. Such permits shall be issued in each county of the state by the clerk of the circuit court, without charge, to such soldiers, sailors, and marines, and nurses above mentioned, and to those of them only who are at the time bona fide residents of such county; except that in the county of Marion, such permits shall be issued only by the Director, without charge, to said soldiers, sailors, marines, and nurses only who are bona fide residents of that county.

(c) Each clerk shall on the first day of each month report in writing to the Director the serial number of each such permit so issued by him in the preceding month and the name of each permittee. Each such permit shall be valid and in force and effect so long as such permit is in a legible and serviceable condition and so long only as such permittee shall be and remain a

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citizen and bona fide resident of this state. If such a permit shall become lost, destroyed, mutilated, illegible or unserviceable, a new permit may be procured and issued in the same manner as the original was procured and issued.

(d) Applications for such permits shall be in writing, and shall be signed and verified by the applicant, who shall, at the time of application, also produce and exhibit his discharge, or a duly authenticated and properly certified copy or certificate thereof.

(e) Such permit shall be carried by the permittee on his person when he is engaged in hunting, fishing, or trapping, and then and there shall be produced and exhibited, on request, to any officer authorized to enforce the Fish and Game laws of this state; and such permit, unless so carried, produced and exhibited shall not have the effect then and there to authorize the permittee to hunt, fish, or trap without a license.

(f) It shall be unlawful for any person to make any false application, representation, oath, affidavit, or affirmation for the purpose of procuring a permit under this section; or to change, alter or counterfeit any permit issued under this section; or to use, or attempt to use, any permit hereunder issued to another person. It shall be unlawful for any permittee hereunder to give, loan, barter, sell or transfer such permit to another person.

Sec. 34. The Director is hereby authorized to issue, without charge, a permit to any Conservation Club or educational institution, or other organization organized for the purpose of the protection or propagation of wildlife to possess or purchase any fish, game birds, game animals, or fur-bearing animals in or out of the open season therefor. The Director shall incorporate such rules and regulations and restrictions as he may deem advisable in such permits and any organization possessing or purchasing fish, game birds, game animals, or fur-bearing animals under such permit shall conform to all of the regulations and restrictions specified therein. Any permit issued under the provisions of this act may be revoked for violation of any provisions thereof, or of the rules and regulations incorporated in or attached to such permit when issued. Any permit issued under the provisions of this act shall not authorize the barter, sale, or trade of any fish, game bird, game animal, or fur-bearing animal.

Sec. 35. The Director is hereby authorized to issue, under such rules and regulations as he shall prescribe, a free permit to any person to possess, out of season, any game bird, game animal, or fur-bearing animal as a pet. Any permit issued under the provisions of this section shall be in the form prescribed by the Director, and shall not be issued unless he is satisfied that such permit should be issued, and he may fix the date of the expiration of such permit. Any permit issued under the provisions of this section may be revoked at any time for violation of any of the rules and regulations duly prescribed in such permit. It shall be unlawful for any person having been issued a permit under the provisions of this section to violate any of the rules and regulations therein contained.

Sec. 36. It shall be unlawful for any person, firm or corporation to use, set, or discharge any dynamite or other explosives in any of the waters of this state without first procuring a permit therefor from the Director as in this act provided. Whoever uses, sets, or discharges dynamite or other explosives in any of the waters of this state, except as in this act provided, shall be deemed guilty of a misdemeanor and shall on conviction be fined not less than fifty (\$50.00) dollars nor more than two hundred fifty (\$250.00) dollars, to which may be added imprisonment for not more than one year, and for a second or other subsequent conviction he shall be deemed guilty of a felony and shall be fined not less than one hundred (\$100.00) dollars nor more than five hundred (\$500.00) dollars, and shall be imprisoned for not less than one year nor more than three years.

Sec. 37. The Director is hereby authorized to issue to any person, firm, or corporation, upon application a free permit to use or discharge dynamite or other explosives in the waters of this state under such rules and regulations as he shall deem necessary for the protection of fish in such waters.

Sec. 38. The Director is hereby authorized to issue to the owner of any private pond a free permit to possess, on his premises, and to use in such private pond only, a seine or trap (except any gill-net, trammel-net, dip-net), under such rules and regulations as the Director shall deem necessary.

Sec. 39. (a) The Director is hereby authorized to issue to any owner of property being damaged by any wild animal or wild bird protected by the provisions of this act a free permit to take, kill, or capture such wild animals or wild birds, except beaver, deer, and wild turkey, in such manner, for such a time, and under such rules and regulations as he may prescribe. The manner of taking such birds and animals, the expiration date of the permit,

and the rules and regulations prescribed by the Director shall be incorporated or attached to such permit when issued. It shall be unlawful for any person who is issued a permit under the provisions of this section to violate any of the rules and regulations incorporated in or attached to such permit when issued. The Director may cause an investigation to be made of any complaint that wild birds, or wild animals are causing damage and if it is found that such damage has not been caused by wild birds or wild animals, or that such person would abuse such privileges, such permit shall be denied.

(b) The owner of any property or his authorized agent may take or kill without a permit, during the respective closed season fixed by law, any skunk, fox, mink, raccoon, or opossum discovered in the act of damaging such property, but such killing or capturing shall be considered unlawful unless such person shall report the killing or capturing of any such animal to the Director, or a game warden, within seventy-two hours after such killing or capturing, and shall have a written receipt of such report. Proof that any wild bird or wild animal was killed or possessed in any closed season therefor, without a permit as required in this section, shall be deemed prima facie evidence that such wild bird or wild animal was taken, killed, or possessed in violation of this act.

(c) Any wild bird or wild animal killed, captured, or taken during the closed season therefor, shall be delivered to the Director or a game warden, and shall be forfeited to the state, and shall be disposed of as the Director shall direct.

Sec. 40. Whenever and so long as any state bordering upon the State of Indiana permits the licensee of an Indiana resident fishing license to fish in that state's portion of any river forming a common boundary line between that state and the State of Indiana or in that state's portion of any lake being upon the boundary line between that state and the State of Indiana, without first obtaining a nonresident fishing license issued by that state, the Director is hereby authorized to permit the licensee of an equivalent resident fishing license of such state to fish in the Indiana portion of such waters without first obtaining an Indiana nonresident fishing license.

Sec. 41. (a) It shall be unlawful to conduct any field trial in this state without first procuring a free permit therefor from the Director.

(b) The Director is hereby authorized to issue a free permit to any person, firm, association, or organization to conduct a field trial under such rules and regulations as he shall deem necessary for the protection of game birds or game animals. Such regulations shall be incorporated in or attached to such permit when issued.

Sec. 42. The Director is hereby authorized to issue to any person a free permit to take, capture, and possess migratory birds, their eggs, nests, or increase for propagation purposes under such regulations as he shall prescribe.

PART VI. MISCELLANEOUS AND GENERAL PROVISIONS.

Sec. 43. (a) It shall be unlawful for any person to use, set or cause to be used or set any net, seine, or trap in any of the waters of this state other than those waters for which such net, seine, or trap is licensed under the provisions of this act.

(b) It shall be unlawful for any person to possess any net, seine, or trap (except gill nets for taking cisco) licensed and tagged under the provisions of this act at a greater distance than one mile from the waters in which such net, seine, or trap may lawfully be used under the provisions of this act.

Sec. 44. It shall be unlawful for any person, directly or indirectly, to charge, collect, or receive for any license required under the provisions of this act more or less than the amount specified in this act, regardless of the official capacity of such person or his legal relation to the licensee.

Sec. 45. It shall be unlawful for any person, firm, or corporation to remove or cause to be removed any tag or seal affixed to any net, seine, or trap under the provisions of this act.

Sec. 46. (a) Any and all licenses and permits, except soldiers', sailors', marines', and nurses' free permits, required and issued under the provisions of this act, shall expire on the 31st day of December next following the date of issue, except as otherwise provided in this act.

(b) All licenses and permits of whatsoever nature or kind issued prior to the taking effect of this act shall expire on the 31st day of December 1937, except soldiers', sailors', marines', and nurses' free permits. Provided, however, that nothing herein contained shall be construed as extending beyond the expiration dates therein prescribed in such licenses or permits as shall by the terms thereof expire prior to December 31st, 1937.

Sec. 47. (a) All licenses and permits issued under the provisions of this act shall be issued upon the express condition to which the licensee or permittee, by acceptance of such license or permit, shall be deemed to agree and consent, that the licensee

or permittee shall obey and comply with all the terms, conditions, and regulations made by the Director under authority of this act and incorporated in or attached to such license or permit when issued, and the provisions of this act.

(b) Any license or permit may be revoked at any time without refund by the Director for failure to comply with, or violation of the terms, conditions, regulations, or restrictions incorporated in or attached to such license or permit when issued or for violation of any provision of this act.

(c) Any person whose license or permit has been revoked by the Director under the provisions of this act may, by written request to the Director, have a hearing on such revocation. Upon receipt of a written request for a hearing on such revocation, the Director shall set a date for such hearing, which shall not be more than fifteen days from the date of receipt of request, and he shall give the person requesting such hearing at least five days notice of the date of such hearing, and such hearing shall be held in the office of the Director. The Director shall receive and keep a record of all evidence presented by any such person, and after considering the evidence presented at such hearing the Director may rescind or affirm the order revoking such license or permit.

ARTICLE III. GAME PROTECTIVE REGULATIONS.

PART I. UPLAND GAME BIRDS.

Sec. 48. It shall be unlawful for any person to hunt, shoot, kill, capture, pursue, or possess, dead or alive, any wild turkey of any species or kind in this state at any time, except as otherwise provided in this act.

Sec. 49. It shall be unlawful for any person to hunt, shoot, kill, capture, pursue, or possess, dead or alive, any ruffed grouse in this state at any time, except as otherwise provided in this act.

Sec. 50. It shall be unlawful for any person to hunt, shoot, kill, capture, pursue, or possess, dead or alive, any chukar partridge in this state at any time, except as otherwise provided in this act.

Sec. 51. It shall be unlawful for any person to hunt, shoot, kill, capture, pursue, or possess, dead or alive, any hen pheasant of any species in this state at any time, except as otherwise provided in this act.

Sec. 52. It shall be unlawful for any person to hunt, shoot, kill, capture, pursue, or possess, dead or alive, any cock pheasant of any species in this state from the first day of December of any year to the ninth day of November of the following year, both dates inclusive, except as otherwise provided in this act.

Sec. 53. (a) It shall be unlawful for any person to shoot, kill, capture, or possess, in this state more than two (2) cock pheasants of any species in any one day from the tenth day of November to the thirtieth day of November of any year, both dates inclusive, except as in this act otherwise provided.

(b) Any person having hunted two days may lawfully possess, but not on his person, at any one time during the open season not to exceed that number of cock pheasants that lawfully may be killed by one person in two days lawful hunting.

Sec. 54. It shall be unlawful for any person to hunt, shoot, kill, capture, pursue, or possess, dead or alive, in this state any Hungarian partridge from the twenty-first day of December of any year to the ninth day of November of the following year, both dates inclusive, except as otherwise provided in this act.

Sec. 55. (a) It shall be unlawful for any person to shoot, kill, capture, or possess in this state more than five (5) Hungarian partridges in any one day from the tenth day of November to the twentieth day of December, both dates inclusive, except as otherwise provided in this act.

(b) Any person having hunted two days may lawfully possess, but not on his person, at any one time during the open season not to exceed that number of Hungarian partridges that lawfully may be killed by one person in two days lawful hunting.

Sec. 56. It shall be unlawful for any person to hunt, shoot, kill, capture, pursue, or possess, dead or alive, in this state, any prairie chicken from the first day of November of any year to the fourteenth day of October of the succeeding year, both dates inclusive, except as otherwise provided in this act.

Notwithstanding any of the preceding provisions of this section or section 57 of this act, it shall be unlawful to hunt, shoot, kill, capture, pursue, or possess any prairie chicken at any time for a period of five years from and after the taking effect of this act.

Sec. 57. (a) It shall be unlawful for any person to shoot, kill, capture, or possess in this state more than three (3) prairie chickens in any one day from the fifteenth day of October to the

thirty-first day of October of any year, both dates inclusive, except as otherwise provided in this act.

(b) Any person having hunted two days may lawfully possess, but not on his person, at any one time during the open season not to exceed that number of prairie chickens that lawfully may be killed by one person in two days lawful hunting.

Sec. 58. It shall be unlawful for any person to hunt, shoot, kill, capture, pursue, or possess, dead or alive, in this state, any quail from the twenty-first day of December of any year to the ninth day of November of the following year, both dates inclusive, except as otherwise provided in this act.

Sec. 59. (a) It shall be unlawful for any person to shoot, kill, capture, or possess, in this state, more than ten (10) quail in any one day from the tenth day of November to the twentieth day of December, both dates inclusive, except as otherwise provided in this act.

(b) Any person having hunted three days may lawfully possess, but not on his person, at any one time during the open season not to exceed that number of quail that lawfully may be killed by one person in three days of lawful hunting.

Sec. 60. (a) It shall be unlawful for any person to take, catch, kill, or attempt to take, catch, or kill in this state, at any time, any quail, prairie chicken, Hungarian partridge, pheasant, ruffed grouse, chukar partridge, or wild turkey by means of any net, trap, snare, or deadfall.

(b) It shall be unlawful for any person to possess at any time any net or trap for the purpose of netting or trapping any quail, prairie chicken, Hungarian partridge, pheasant, ruffed grouse, chukar partridge, or wild turkey.

Sec. 61. (a) It shall be unlawful for any person to sell or offer to sell, buy or offer to buy at any time in this state, any quail, prairie chicken, Hungarian partridge, pheasant, ruffed grouse, chukar partridge, or wild turkey, whether taken in this state or in some other state and brought into this state, except as otherwise provided in this act.

(b) The term "sale" shall include serving the same as a part of a meal by any restaurant, hotel, boardinghouse or eating-house keeper, and proof that any such quail, prairie chicken, Hungarian partridge, pheasant, ruffed grouse, chukar partridge, or wild turkey was so served shall constitute prima facie evidence that such birds were so served in violation of the provisions of this act, but such restaurant, hotel, boardinghouse or eating-house keeper may prepare and serve during open season to a guest, patron, or boarder and his family any of the above mentioned game lawfully taken by such guest, patron, or boarder during the open season provided therefor in this state.

PART II. MIGRATORY BIRDS.

Sec. 62. It shall be unlawful for any person to hunt, shoot, take, capture, kill, trap, net or destroy, or attempt to take, capture, kill, trap, net, or destroy, or possess, sell, offer for sale, purchase, offer to purchase, or to ship, transport or carry or deliver or receive for shipment, transportation or carriage in any manner beyond the limits of the State of Indiana, any migratory bird designated in this act, or any part, nest or egg thereof, except only as otherwise permitted by the provisions of this act.

Sec. 63. The migratory birds as used in this act shall be construed to mean the following birds:

1. Migratory game birds: (a) Anatidae, or waterfowl, including brant, wild ducks, wild geese and swans; (b) Gruidae, or cranes, including little brown, sandhill and whooping cranes; (c) Rallidae, or rails, including coot, gallinules, and sora and other rails; (d) Limicolae, or shorebirds, including avocets, curlews, dowitchers, godwits, knots, oyster catchers, phalaropes, plovers, sandpipers, snipe, tilts, surf birds, turnstones, willet, woodcock, tattlers, and yellowlegs; (e) Columbiade, or pigeons, including doves and wild pigeons.

2. Migratory insectivorous birds: Cuckoos; flickers and other woodpeckers; nighthawks or bull-bats, and whippoorwills; swifts; humming birds, flycatchers; bobolinks, meadowlarks and orioles; grosbeaks; tanagers; martins and other swallows; waxwings; shrikes, vireos; warblers; pipits; catbirds and brown thrashers; wrens; brown creepers; nuthatches; chickadees and titmice; kinglets and gnat catchers; robins and other thrushes; and all other perching birds which feed entirely or chiefly on insects.

3. Other migratory nongame birds: Auks, auklets, bitterns, fulmars, gannets, grebes, guillemots, gulls, herons, jaegers, loons, murre, petrels, puffins, shearwaters, and terns.

Sec. 64. (a) The laws of the United States, the Migratory Bird Treaties of the United States with other countries, and the rules and regulations issued and promulgated by any department of the United States Government, concerning migratory birds, now in force or hereinafter enacted or promulgated, shall have the force and effect of law in this state, except as otherwise provided herein.

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(b) It shall be unlawful for any person in this state to violate any provision of any law of the United States, any treaty of the United States with any other country, or any rule or regulation duly issued and promulgated by any department of the United States Government concerning migratory birds, now in force or hereinafter enacted, consummated, or issued, except as herein otherwise provided.

(c) It shall be unlawful for any person to hunt, shoot, take, kill, or possess, or attempt to hunt, shoot, take, kill, or possess, sell or offer to sell, purchase or offer to purchase, ship or transport, carry or deliver, or receive for shipment, transportation or carriage in this state, any migratory bird in violation of any law of the United States, any treaty of the United States with any other country, or any rule and regulation duly issued and promulgated by any department of the United States Government pursuant to any law or treaty of the United States, concerning migratory birds, now in force or hereinafter enacted or promulgated, except as herein otherwise provided.

Sec. 65. It shall be unlawful for any person to use or possess more than one shot gun while hunting or shooting migratory birds.

Sec. 66. It shall be unlawful for any person to take, capture, pursue, or possess for any purpose whatsoever, during the closed season thereon, migratory birds, their nests, eggs, or increase, without first procuring a permit or license issued by the Director under the provisions of this act, or without first procuring the written approval of the Director of any permit issued by any department of the United States Government, authorizing the permittee to take, capture, pursue, or possess for any purpose whatsoever, any migratory birds, their nests, eggs, or increase, during the closed season thereon.

PART III. OTHER BIRDS.

Sec. 67. It shall be unlawful for any person at any time to shoot, kill, take, injure, or molest any American or Bald Eagle or any Golden Eagle, or to take, injure, destroy, or molest the nest or eggs of any American or Bald Eagle or any Golden Eagle in this state.

Sec. 68. It shall be unlawful for any person to hunt, shoot, kill, trap, net, or destroy, or to possess, sell, offer for sale, purchase, offer to purchase, or to ship, transport, carry, or deliver, or receive for shipment, transportation or carriage in any manner beyond the limits of this state, any wild bird or any part, nest, or egg thereof, except only as in this act permitted or provided.

(b) English or European house sparrows, starlings, crows, sharpshinned hawks, Cooper's hawks, goshawks, and great horned owls are hereby declared pests and it shall be lawful to take, shoot, or kill such birds at any time, except in this act otherwise provided.

Sec. 69. It shall be unlawful for any person to shoot, kill, take, or injure any homing pigeon in this state at any time.

Sec. 70. It shall be unlawful for any person to hunt, shoot, kill, take, or injure any mourning dove or turtle dove in this state at any time.

PART IV. UPLAND GAME ANIMALS.

Sec. 71. It shall be unlawful for any person to hunt, shoot, kill, capture, pursue, or to possess, dead or alive, any wild deer, buck, doe, or fawn, or any part thereof, of any species or kind in the State of Indiana at any time, except as otherwise provided in this act. Any person who shall violate any provision of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined not less than fifty dollars (\$50.00) nor more than two hundred dollars (\$200.00) and may be imprisoned not less than thirty (30) days nor more than six (6) months, and shall, for the second and each subsequent conviction thereafter, be fined not less than one hundred dollars (\$100.00) nor more than two hundred dollars (\$200.00) and shall be imprisoned not less than thirty (30) days nor more than six (6) months. Each wild deer, buck, doe, or fawn of any species or kind thereof, so shot, killed, captured, pursued or had in possession, shall constitute a separate offense.

Sec. 72. (a) It shall be unlawful for any person to hunt, shoot, kill, capture, trap, possess, or molest any beaver or possess the untanned hide or fur thereof, in this state at any time.

(b) It shall be unlawful for any person to destroy, disturb, molest, or attempt to destroy, disturb, or molest, at any time, any house, burrow, den, or dam built, used, or occupied by any beaver or beavers in this state except as in this act provided.

(c) It shall be unlawful for any person to set or cause to be set any trap, snare, or deadfall closer than twenty-five (25) feet to any dam, house, burrow, den, or cuttings built, used, occupied, or cut by any beaver.

(d) It shall be unlawful for any person to sell or offer to sell, buy or offer to buy, any beaver or the untanned hide or fur thereof, in this state.

Sec. 73. The Director is hereby authorized to take, catch, or transport beaver at any time. Upon verified complaint of any land owner in this state that any beaver or beavers are damaging or about to damage his property, the Director shall investigate such claim, and, if it is then and there found that beavers are damaging or about to damage the property of the claimant, the Director shall catch and remove such beavers and shall destroy the houses, dens, and dams of such beavers. If the Director then and there finds that there has been no damage or threatened damage to the claimant's property by beavers, said beavers, their houses, dens, and dams shall not be disturbed. The claimant shall have the right to petition the Circuit Court of the county in which his property is located for an order mandating the Director to remove any beaver or beavers damaging or about to damage his property. If the Court shall find that the damage complained of was caused by beavers, such order may be entered and the Director shall remove such beavers.

Sec. 74. (a) It shall be unlawful for any person to hunt, shoot, kill, capture, or pursue, or possess in this state any wild rabbit from the eleventh day of January to the ninth day of November, both dates inclusive, of any year, except as otherwise provided in this act.

(b) It shall be unlawful for any person to shoot, kill or capture, in this state, from the tenth day of November to the tenth day of January, both dates inclusive, more than ten (10) wild rabbits in any one day, except as otherwise provided in this act.

(c) It shall be unlawful for any person, firm, or corporation to have in his or its possession, or to ship, carry, or transport in this state more than twenty (20) wild rabbits, dead or alive, in any one day, whether such rabbits were shot, killed, or captured by such person, firm, or corporation, or acquired in any other manner in this state or in some other state and brought into this state.

Sec. 75. (a) It shall be unlawful for any person to hunt, shoot, kill, capture, or pursue, or possess any fox squirrel or grey squirrel in the State of Indiana, at any time, except as provided in this act.

(b) The Director is hereby authorized by order to designate and provide an open season on squirrel not to exceed sixty (60) days in any one year, for any county, counties, or areas, or for the entire state. The order designating and providing for an open season on squirrel shall specify the county, counties, or areas affected thereby. A copy of such order shall be sent to the clerk of the Circuit Court and to the sheriff of each county fifteen (15) days before the taking effect of such order. The sheriff shall post such order at the court house where other legal notices are posted upon receipt of the same. The Director shall cause a copy of such order to be posted in two conspicuous places in each township affected, fifteen (15) days before the taking effect of such order.

(c) It shall be unlawful for any person to shoot, kill, take, or possess in the State of Indiana more than five (5) squirrels in any one day during any open season designated and provided pursuant to this act.

(d) It shall be unlawful for any person to sell, offer to sell, purchase, or offer to purchase any fox squirrel or grey squirrel in this state.

(e) It shall be unlawful to hunt, shoot, kill or shoot at or in any manner disturb any squirrel in any public park or state grounds, at any time in the State of Indiana.

Sec. 76. (a) It shall be unlawful for any person to hunt, shoot, kill, trap, capture, pursue, or possess any raccoon, opossum, skunk, mink, or muskrat, or possess the untanned hide or fur thereof, in the State of Indiana from the sixteenth day of January to the fourteenth day of November of any year, both date inclusive, except as in this act otherwise provided.

(b) Any person, for a period of five days after the last day of the open season therefor, may possess any such animals or the untanned hide or fur thereof, which have been legally taken in the preceding open season as herein provided.

Sec. 77. It shall be unlawful for any person to remove or dislodge, or attempt to remove or dislodge any wild raccoon in any manner at any time, in this state, from any hole, den, pocket, cavity or hollow in any tree, or from any cavity, or den in or among any rocks wherein such raccoon has secreted itself for security or protection or in which it maintains its nest or den.

Sec. 78. (a) It shall be unlawful for any person to set or place any trap, snare, or deadfall in any tile drain or closer than five (5) feet to an opening of any tile drain in this state.

(b) It shall be unlawful for any person to take, catch, or capture any raccoon by means of any trap, snare, or deadfall in any tile drain or within five (5) feet of an opening in any tile drain in this state.

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Sec. 79. For the purpose of regulating the hunting, killing, trapping, possessing, or capturing of fox in the State of Indiana, the state is hereby divided into two zones which shall be known, respectively, as the northern zone and the southern zone. The northern zone shall consist of and include the counties of Warren, Tippecanoe, Clinton, Tipton, Grant, Blackford, and Jay, and all of the other counties of the state which are situated north of the said counties, and in addition thereto Clark and Montgomery counties, and the southern zone shall consist of and include all of the counties in the state which are not included in the northern zone.

Sec. 80. (a) It shall be lawful for any person to take, trap, shoot, kill or possess any red fox, or possess the untanned hide or fur of any red fox, in the northern zone at any time.

(b) It shall be lawful for any person to take, trap, shoot, kill, or possess any red fox, or possess the untanned hide or fur of any red fox at any time in the southern zone until the 15th day of January, 1939, and thereafter it shall be unlawful to take, trap, shoot, kill, or possess the untanned hide or fur of any red fox in the southern zone from the 16th day of January to the 14th day of November, both dates inclusive. The provisions of this act concerning fur-bearing animals shall not be construed to include red fox until the 15th day of January, 1939.

(c) In the southern zone, for the purpose of disposing of the same, any person may, for a period of five days after the last day of the open season provided for red fox, possess such red fox, or the untanned hide or fur of any red fox, which has been legally taken in open season in the southern zone, as herein provided.

(d) It shall be lawful to hunt, trap, shoot, kill or possess grey fox at any time in both the southern zone and the northern zone and the provisions of this act concerning fur-bearing animals shall not be construed to include grey fox.

Sec. 81. It shall be unlawful for any person to injure or destroy any muskrat house at any time.

Sec. 82. It shall be unlawful for any person to hunt, catch, take, or attempt to hunt, catch, or take any rabbit or other species of game, in any manner, anywhere in this state, with or by means of or by the use of any ferret, or with or by means of or by the use of any other small animal which is used in the same or similar manner in which ferrets are used for hunting, or with or by means of any mechanical device which is used for the purpose of driving or frightening rabbits or any other species of game from their holes or dens.

PART V. GAME—GENERAL AND MISCELLANEOUS PROVISIONS FOR ITS PROTECTION.

Sec. 83. It shall be unlawful for any person to hunt, shoot, kill, or shoot at any game bird, game animal, or fur-bearing animal along, upon, or across any public highway in this state.

Sec. 84. It shall be unlawful for any person to hunt, shoot, or kill, or attempt to hunt, shoot, or kill any wild rabbit with or by means of any spotlight, searchlight or other artificial light, whatsoever, in this state.

Sec. 85. It shall be unlawful for any person to hunt, shoot, kill any wild birds, rabbits or any species of game with any kind of firearms on the first day of the week commonly known as Sunday.

Sec. 86. (a) It shall be unlawful for any person to take, capture, or attempt to take or capture any fur-bearing animal by digging, cutting, or chopping into the hole, burrow, tree, or den where such animal is hidden or sheltered, or by the use of smoke, fumes, or chemicals introduced into such hole, burrow, tree, or den, except as otherwise provided in this act.

Sec. 87. It shall be unlawful for any person to use or possess any apparatus designed for use with or on any firearm commonly called a silencer, or to use or possess any device used as a silencer in this state while in the act of hunting.

Sec. 88. (a) It shall be unlawful for any person to hunt, shoot, kill, pursue, trap, injure, or take in any manner, at any time, any wild animal, wild bird, or fish on any land owned by the State of Indiana, or upon any land controlled by this state under contract with the owner thereof, except as otherwise provided in this section.

(b) It shall be unlawful for any person to go upon, enter upon, or be upon any land owned by the State of Indiana, or any land controlled by this state under contract with the owner thereof, with a firearm, except as otherwise provided in this section.

(c) The Director is hereby authorized to issue and promulgate an order and regulation setting aside and designating any lands now owned, or hereafter acquired by the state for conservation purposes, or any lands controlled by the state under contract

with the owner thereof for conservation purposes as a public hunting and fishing ground, and thereunder may permit any person to hunt, catch, or take, thereon, such wild birds and wild animals, and fish in open season therefor, in such manner and at such times, and under such restrictions, conditions, and limitations as he may deem proper.

Sec. 89. (a) Any resident of this state having at the time a valid nonresident hunting or fishing license issued by any other state or country lawfully may possess in this state any number of wild birds or wild animals or fish that he could and did lawfully kill, take, and possess under authority of such nonresident license in the state or country issuing the same, under such rules and regulations as in this act provided.

(b) The possession of birds, wild animals, and fish taken, killed, and possessed in another state or country under a valid nonresident license issued by such other state or country shall be unlawful in this state when the taking, killing or possession of such wild birds or animals shall be unlawful in the state or country issuing such nonresident license, unless the person taking and possessing such wild birds, wild animals, or fish shall notify the Director or a Game Warden, in writing, that he possesses such wild bird or wild animal in this state, and obtains from him a receipt of such notice.

ARTICLE IV. FISH, FROGS, AND MUSSELS—PROTECTIVE REGULATIONS.

PART I. FISH, CLOSED SEASON, BAG LIMITS, SIZE LIMITS, SPAWNING GROUNDS.

Sec. 90. (a) It shall be unlawful for any person to take, catch, kill, or possess in this state any smallmouthed bass (*Micropterus dolomieu*), largemouthed bass (*Micropterus salmoides*), Kentucky bass (*Micropterus pseudaplites*), bluegill (*Lepomis pallidus*), yellow perch (*Perca flavescens*), pike or pickerel (*Esox lucius*), silver or yellow bass (*Morone interrupta*), white or striped bass (*Roccus chrysops*), rock-bass (*Ambloplites rupestris*, commonly known as red-eye or goggle-eye), red-eared sunfish (*Eupomotis heros*), pike-perch (*Stizostedion vitreum*, commonly known as wall-eye or jack salmon), or crappie (*Pomoxis sparoides* and *Pomoxis annularis*) from the first day of May to the fifteenth day of June (both dates inclusive) of each year, except as in this act otherwise provided.

(b) It shall be unlawful for any person to take, catch, kill, or attempt to take, catch, or kill any rainbow, brown, Loch Leven, brook, or speckled trout in the waters of this state at any time from the 1st day of September to the 30th day of April, both dates inclusive.

Sec. 91. (a) It shall be unlawful for any person to take or catch, in any one day during the open season therefor, from the waters of this state in the aggregate more than twenty-five (25) bluegill (*Lepomis pallidus*), red-eared sunfish (*Eupomotis heros*), crappies (*Pomoxis sparoides* and *Pomoxis annularis*), or rock-bass (*Ambloplites rupestris*) combined.

(b) It shall be unlawful for any person to take or catch in any one day during the open season therefor, from the waters of this state in the aggregate more than six (6) smallmouthed black bass (*Micropterus dolomieu*), largemouthed bass (*Micropterus salmoides*), silver bass (*Morone interrupta*), Kentucky bass (*Micropterus pseudaplites*), or white or striped bass (*Roccus chrysops*) combined.

(c) It shall be unlawful for any person to take or catch from the waters of this state in any one day during the open season therefor, more than six (6) pike-perch (*Stizostedion vitreum*), or more than six (6) pike or pickerel (*Esox Lucius*).

(d) Any person having fished two days may lawfully possess at any one time during the open season not to exceed that number of any of the above species of fish that may be lawfully caught in two days lawful fishing. It shall be unlawful for any person to possess at any one time more than two days lawful catch of such fish.

(e) It shall be unlawful for any person to take, catch, kill, or possess more than fifteen (15) trout in any one day, or at any one time.

Sec. 92. (a) It shall be unlawful for any person to take, catch, kill, or possess from the waters of this state any pike-perch (*Stizostedion vitreum*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), silver bass or yellow bass (*Morone interrupta*), Kentucky Bass (*Micropterus pseudaplites*), white or striped bass (*Roccus chrysops*) less than ten (10) inches in length; or any crappie (*Pomoxis sparoides* and *Pomoxis annularis*), rock-bass (*Ambloplites rupestris*), bluegill (*Lepomis pallidus*), or red-eared sunfish (*Eupomotis heros*), less than five (5) inches in length.

(b) Any such fish taken unintentionally from the waters of this state shall be returned immediately to said waters from

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which it was so taken without unnecessary injury, and any failure so to return such fish shall constitute a violation of the provisions of this section.

(c) It shall be unlawful for any person, knowingly or intentionally, to take, catch, or kill, in any of the waters of this state, or to have in his possession at any time, any rainbow, brown, Lock Leven, brook or speckled trout less than seven (7) inches in length. In case any such trout is taken or caught, the person taking or catching it shall immediately return it to the waters from which it was taken without unnecessary injury.

Sec. 93. (a) The Director is hereby authorized to designate and set aside any lake or stream or part thereof, in this state, as spawning grounds for fish. The Director shall designate the general extent, limits or periphery of such spawning grounds by appropriate signs.

(b) It shall be unlawful for any person or persons to take, catch, kill, or pursue for the purpose of taking, catching, or killing any fish whatsoever, from any such designated spawning ground or grounds during the time the same shall be set apart as provided in this act.

(c) It shall be unlawful for any person or persons to operate or cause to be operated any power-propelled boat on or over such designated spawning grounds during the time the same shall be set apart, as provided in this act.

(d) It shall be unlawful for any unauthorized person or persons to disturb or remove any sign or signs erected under the provisions of this act.

(e) It shall be unlawful for any person to take, catch, or capture any minnows of any variety within the limits of any spawning grounds designated and established by the state for the breeding and propagation of fish.

PART II. FISHING—UNLAWFUL METHODS.

Sec. 94. It shall be unlawful for any person to take, catch, kill, injure or destroy, or attempt to take, catch, kill, injure or destroy any fish in the waters of this state by means of any gig, spear, seine, net, trap, weir, gaff hook, snare, electric current, or by means of dynamite or other explosives, or by means of any substance which has a tendency to stupefy or poison fish, or by means of the hands alone, or by any means other than angling with hook and line, except as in this act otherwise provided.

Sec. 95. It shall be unlawful for any person, firm, or corporation to possess any seine, dip-net, gill-net, trammel-net, pound-net, or any other kind of fishing net whatsoever, or any spear, gig, or fish trap, or any part thereof, in this state, except as otherwise provided in this act.

Sec. 96. (a) It shall be unlawful for any person to fish with or set in any lake in this state any device commonly known as a trot line, set line, throw line, or set hook line of any kind, or with any hook and line attached to a bottle or other floating device (other than a bobber or cork attached to a pole and line that is attended), except as otherwise provided in this act.

(b) It shall be lawful to fish, use, or set in any lake in this state between the hours of sunset and sunrise a trot line, set line, throw line, or set hook lines, having thereon not more than fifty (50) hooks not smaller than one-half inch from point to shank, baited with bait other than minnows, fish or crawfish, and the bait being sunk to a depth of not less than five feet.

Sec. 97. It shall be unlawful for any person to fish, use, or set in any stream of this state, except in that part of the Wabash River which forms the common boundary line between the states of Indiana and Illinois, any trot line or set line having any hook thereon smaller than one-half inch from point of hook to shank, or with a trot line or set line having thereon more than fifty (50) hooks, or with more than one trot line or set line, or with any line and hook attached to any floating device, other than a bobber or cork, attached to pole and line that is attended.

Sec. 98. It shall be unlawful for any person to shoot, or shoot at any fish of any kind in any of the waters of this state.

Sec. 99. (a) The Director is hereby authorized to make such regulations and restrictions for the taking and transporting of minnows for commercial purposes that he may deem proper and necessary for an adequate protection or propagation thereof or otherwise to promote the general purpose of this act. Such regulations and restrictions shall be promulgated as provided in this act for the promulgation of discretionary orders abridging open seasons, decreasing bag limits and regulating the methods of taking, and shall have the force and effect of law and it shall be unlawful for any person to violate any such regulations and restrictions so promulgated.

(b) Minnows, not including the young of any species of game fish, lawfully may be taken for bait with minnow traps, dip-

nets, and seines of the dimensions specified in this section, only from the sixteenth day of June to the thirtieth day of April, both dates inclusive.

(c) Minnow seines, not more than twelve (12) feet in length and four (4) feet in depth, and having a mesh not less than one-fourth ($\frac{1}{4}$) of an inch, may be lawfully possessed and used in any of the waters of this state, to take minnows, not including the young of any species of game fish, for bait.

(d) Dip-nets, not exceeding three (3) feet square without sides or walls and having a mesh not larger than one-fourth ($\frac{1}{4}$) of an inch, and minnow traps, not exceeding twenty-four (24) inches in length, may be lawfully possessed and used to take minnows, not including the young of any species of game fish, for bait in any of the waters of this state.

(e) Minnow seines and traps of greater dimensions than herein authorized may be lawfully possessed and used in Lake Michigan within the jurisdiction of this state and any lake or river of this state under special permit issued by the Director and under such rules and regulations as he may prescribe.

(f) For the purpose of this section, minnows shall be defined as chubs, shiners, suckers, dace, stonerollers, muddlers, and mud-minnows, and young of any fish except young of game fish.

Sec. 100. Suckers, carp, gar, and dogfish lawfully may be taken with a snare or pitchfork without barbs, only between sunrise and sunset. The term "pitchfork" as used in this section shall be construed to mean a pitchfork in its ordinary sense, that has not been altered in any way.

Sec. 101. Any person may lawfully land, by use of a landing net, gaff hook, gaff or grab hook any fish that at the time shall be hooked on any lawful hook and line. The term gaff hook and gaff, as used in this act, shall be construed to mean an implement of metal or other hard or tough material with or without barbs, making a single hook having a shank with or without a handle and being of sufficient size to permit its being held in the hand for seizing, holding, or sustaining fish. The term grab hook as used in this act, shall be construed to mean any device or implement which may be used as a tong, used to clutch or close down on or grasp fish.

Sec. 102. (a) It shall be unlawful for any person to take, catch, or kill, or attempt to take, catch, or kill any rainbow, brown, Loch Leven, brook, or speckled trout in any of the waters of this state in any manner or by any means other than by the use of a hook and line equipped with artificial bait or any form of natural bait not otherwise prohibited by law, except trout fry or trout minnows.

Sec. 103. It shall be unlawful for any person at any time to sell, barter or exchange, or offer to sell, barter or exchange, or purchase or offer to purchase any largemouth bass (*Micropterus salmoides*), Kentucky bass (*Micropterus pseudoplites*), small-mouth bass (*Micropterus dolomieu*), silver bass or yellow bass (*Morone interrupta*), white bass or striped bass (*Morone chrysops*), bluegill (*Lepomis pallidus*), red eared sunfish (*Eupomotis heros*), crappies (*Pomoxis annularis* and *Pomoxis sparoides*), or rock bass (*Ambloplites rupestris*), whether taken within this state or taken in some other state and brought into this state. The term "sale" shall include serving the same as a part of a meal by any restaurant, hotel, boarding house or eating house keeper, and proof that any fish above mentioned was so served shall constitute prima facie evidence that such fish was so served in violation of the provisions of this act, but such restaurant, hotel, boarding house or eating house keeper may prepare and serve during the open season to a guest, patron or boarder and his family any of the above mentioned fish lawfully taken in open season in this state by such guest, patron, or boarder.

PART III. ICE FISHING IN LAKES.

Sec. 104. It shall be unlawful for any person to fish or attempt to fish in any of the lakes, rivers or streams of this state through more than two holes in the ice on such lake, river or stream at one time, or through a hole more than two and one-half feet in diameter, or with more than one line to each hole, or with more than one hook attached to such line, or within any house, shanty or structure which will obstruct a full view of such fishing.

Sec. 105. It shall be unlawful for any person to take, catch, or kill, or attempt to take, catch, or kill any fish from any lake in this state having a water area of not more than two and one-half square miles and not less than two square miles, as shown by the twenty-fifth annual report of the Department of Geology and Natural Resources of the State of Indiana for the year 1900, when the waters of such lakes are covered in whole or in part with ice.

PART IV. FISH LADDERS—REGULATIONS.

Sec. 106. (a) The owner or owners of any dam across any of the rivers, streams or watercourses in this state now existing or hereafter constructed, when such dam is the height of four feet

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or over, shall construct and maintain fish ladders on such dam sufficient to allow the fish below the dam to pass over such dam into the waters above. Such fish ladders shall be constructed in such manner and of such materials as shall be prescribed by the Director.

(b) If the owner or owners of any such dam shall fail or refuse to comply with the provisions of this act, then it shall be the duty of the trustee of the township in which such dam is situated, notwithstanding it may be within some incorporated city or town, to proceed to erect on said dam such ladders as will afford a passage for such migrating fish below such dam over into the waters above such dam, and the cost thereof shall be a debt due from the owner or owners of such dam and water power, and shall constitute a lien on such dam and water power and so much of the real estate on each side of said dam as may be used in connection therewith belonging to such owners and necessary to a proper use and enjoyment of such dam and water power, and if the owner of such dam shall fail or refuse to pay the amount thereof to such trustee, on demand, he shall sue and recover the same, and may also have foreclosure of such lien as in case of foreclosure of mortgages, and the court shall order the sale of such dam, water power and real estate as other real property is sold on execution without relief from valuation or appraisal laws; and wherever any dam is now located or may be constructed across any river, stream, or watercourse forming the boundary line between two townships, or between two counties, then the trustee of either township in which any part of said dam is situated, in case of such failure, may construct such ladder and have the same remedy against such owner or owners as is provided where any such dam is situated wholly in one township.

Sec. 107. (a) It shall be the duty of the owner or owners of any dam in the State of Indiana to keep the fish ladders required under provisions of this act in repair, and if any shall become out of repair, the owner or owners of the dam on which such fish ladder is located shall repair the same. The trustee of the township in which such dam is located shall, upon failure of the owner or owners thereof to repair such dam or keep the same in repair, after thirty days written notice to the owner or owners of such dam, make such repairs as may be necessary or proper and recover the cost thereof from such owner or owners as provided in this act in cases of failure to construct such fish ladders.

(b) It shall be unlawful for any person, firm, or corporation to fail to construct or permit to become out of repair any fish ladders required under the provisions of this act.

PART V. COMMERCIAL FISHING DEVICES—REGULATIONS.

Sec. 108. All fish of whatsoever kind in the waters of Lake Michigan within the jurisdiction of this state shall be and are hereby declared to be the property of this state, and shall not be taken, transported, sold, or possessed contrary to the provisions of this act.

Sec. 109. Any person having a license to operate commercial fishing gear in Lake Michigan shall keep an accurate record of each day's catch, of the number of pounds of each kind of fish taken, of the locality fished, of the kind and amount of fishing gear employed, of the length of time each unit of gear was fished without being lifted, of the kind and amount of spawn taken, of the kind and amount of caviar taken, and such other data as the Director may require, and shall on the first day of each month report (under oath when requested so to do) all the above data for the preceding month to the Director upon blanks therefor to be furnished by the Director. Such reports shall be so made each month regardless of whether or not any fish were taken during the preceding month, and if no fish were taken, that fact shall be so noted. The failure of any licensee promptly to make any such report shall be cause for revocation of the license and for denial of a new license.

Sec. 110. It shall be unlawful for any person, firm, or corporation to use in the waters of Lake Michigan within the jurisdiction of this state any pound-net, trap-net, gill-net, seine, or any fixed, set or movable net or trap of any kind or description whatsoever, the character, kind, meshes and construction of which are different than prescribed by this act:

(a) Gill-nets with meshes of not less than four and one-half ($4\frac{1}{2}$) inches may be used for taking whitefish and trout.

(b) Gill-nets with meshes not less than two and one-half ($2\frac{1}{2}$) inches nor more than two and seven-eighths ($2\frac{7}{8}$) inches may be used for taking chubs and perch, wherever and whenever they will not take to exceed ten (10) per cent by weight of other fish, such percentage to be determined by the Director or his agents or officers by inspection of the fish taken.

(c) Gill-nets with meshes of not less than two and three-eighths ($2\frac{3}{8}$) inches may be used for taking blue-back herring,

wherever and whenever they will not take to exceed ten (10) per cent by weight of other fish, such percentage to be determined by the Director by inspection of the fish taken.

(d) Gill-nets with meshes of not less than one and one-half ($1\frac{1}{2}$) inches nor more than two (2) inches may be used for the purpose of procuring bait for use in baiting hook lines, when and where such nets will not take undersize fish.

(e) No gill-net mentioned in this section shall have a greater measurement than eleven (11) feet in depth.

(f) Pound-nets with the pot, crib or pocket, being that part of the net in which fish are finally captured, having meshes of not less than three and one-half ($3\frac{1}{2}$) inches in the bottom, sides and front, with the back having meshes of not more than two (2) inches, for at least fifteen (15) feet below the surface of the water, with the lead having meshes of not less than five (5) inches, the funnel and the heart having meshes of not less than four (4) inches, may be used for taking whitefish and trout.

(g) Pound-nets with the front, sides and bottom of the pot, crib or pocket having meshes of not less than two and one-fourth ($2\frac{1}{4}$) inches and the back having meshes of not more than two (2) inches, the funnel inside of the pot, crib or pocket two and one-fourth ($2\frac{1}{4}$) inches, and such part of the funnel outside of the crib or pocket with the heart and lead four (4) inches, may be used for the purpose of taking perch, herring and other rough fish.

(h) The size of meshes of all gill-nets as prescribed in this section shall be determined by extension measure as found in use; the size of all pound-net meshes shall be determined by extension measure as manufactured. Extension measure shall mean the distance between the extreme angles of any single mesh and such measurement shall be after the twine is taut without any strain whatever and shall be between and inside the knots.

(i) All undersized uninjured fish, except herring, chubs and perch, shall be returned to the waters from which they were taken with as little injury as possible, by the person or persons lifting the net or nets. The Director shall remove any of such nets whenever and wherever, from said inspection, he shall determine that such nets are taking more fish, other than herring, chubs and perch, than is allowed by the provisions of this section.

(j) All nets and mesh twine the use of which is made unlawful in this act shall be seized and confiscated by the Director.

Sec. 111. (a) No person, firm, or corporation shall use, set or cause to be used or set in Lake Michigan within the jurisdiction of this state any deep trap-net, shallow trap-net, pound-net, fyke-net, hoop-net, drop-net, or any other impounding net of any type whatsoever, or any part of the webbing of such net or nets in water of a depth greater than fifty (50) feet.

(b) No person, firm or corporation shall use, set or cause to be used or set in Lake Michigan within the jurisdiction of this state any submerged impounding net, the lifting crib or pot of which exceeds 15 feet in depth or in width or the lead of which exceeds 25 feet in depth.

(c) All impounding nets, any part of the crib or pot of which extends to or above the surface of the water, shall also have the entire hearts and lead extend to or above the surface of the water, and if any part of the crib or pot of such nets is uncovered at the top this open part of the crib or pot shall have the same dimensions as the same pot at its greatest width and length. The hearts of all impounding nets with any part of the crib or pot uncovered shall be entirely uncovered at the top and bottom and the sides of such hearts shall be vertical. The crib or pot and hearts of all impounding nets with any part of the crib or pot uncovered shall be held in place and supported entirely by means of stakes driven into the bottom of the lake.

(d) It shall be unlawful for any person, firm, or corporation to take or catch whitefish or trout in any submerged impounding net in Lake Michigan within the jurisdiction of this state except in such submerged impounding nets having meshes not less than three and one-half ($3\frac{1}{2}$) inches in the lifting pot, crib or pocket, and having such meshes not less than four (4) inches in the funnel and heart, and having meshes not less than five (5) inches in the lead.

(e) It shall be unlawful for any person, firm, or corporation to take or catch any perch, herring, or other rough fish in any submerged impounding net in Lake Michigan within the jurisdiction of this state except in such submerged impounding nets having meshes not less than two and one-fourth ($2\frac{1}{4}$) inches in the lifting pot, crib or pocket and in the funnel inside the pot, crib or pocket, and having meshes not less than four (4) inches in such part of the funnel outside the crib or pocket, in the heart and in the lead.

(f) The size of the mesh as prescribed in this section shall be determined by extension measure as manufactured. Extension measure shall mean the distance between the extreme angles of any single mesh and such measurements shall be after the twine

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is taut, without any strain whatsoever, and shall be between and inside the knots.

(g) All submerged impounding nets set or used contrary to this section or having meshes different than the size herein prescribed in this section shall be unlawful.

Sec. 112. (a) It shall be unlawful for any person, firm, or corporation to take for commercial purposes from the waters of Lake Michigan within the jurisdiction of this state any lake trout from the twentieth day of October to the twenty-second day of November, both dates inclusive, in each year; or any perch from the fifteenth day of April to the fifteenth day of June, both dates inclusive, in each year; or any whitefish from the fifth day of November to the fifteenth day of December, both dates inclusive, in each year.

(b) It shall be unlawful to set nets for the taking of trout or whitefish before the first day of the respective open season for taking said fish.

(c) Any person, firm, or corporation engaged in the taking of fish for commercial purposes from May fifteenth to September fifteenth, both dates inclusive, in each year, under the provisions of this act, shall carry sufficient ice and properly chill such fish at the time and the place of their removal from the water.

(d) Proof that any person, firm, or corporation possesses on any boat any fish mentioned in this section during the closed season provided therefor, shall be deemed prima facie evidence that such fish were taken in violation of this section.

Sec. 113. It shall be unlawful for any person, firm, or corporation to market, sell, offer for sale or to possess for the purpose of sale at any time in this state, whether caught within or without this state, any:

(a) Whitefish, of less weight than two (2) pounds in the round, or one (1) pound and ten ounces when dressed, and one (1) pound and six (6) ounces when dressed, head off and salted;

(b) Lake trout, of a less weight than one and one-half ($1\frac{1}{2}$) pounds in the round, or one and one-fourth ($1\frac{1}{4}$) pounds when dressed;

(c) Perch of a less length than eight (8) inches.

Sec. 114. It shall be unlawful for any person, firm, or corporation using pound nets in said waters of Lake Michigan under the jurisdiction of this state to take with such nets from said waters any fish of smaller size than prescribed in Section 113 of this act, and all such undersize fish found in such nets shall be returned to such waters with as little injury as possible by the person or persons lifting such net or nets: Provided, that it shall not be unlawful for such fisherman to possess not to exceed in quantity the percentage allowed in Section 110 of this act of lake trout, whitefish, or perch of less weight or length than established by this act which are caught in two and one-half ($2\frac{1}{2}$) inch mesh gill-nets, but the same may be transported, sold or disposed of only under the direction and with the permission of the Director.

Sec. 115. It shall be unlawful for any person, firm, or corporation to take or catch with any kind of a net or other commercial fishing device or gear in the waters of Lake Michigan within the jurisdiction of this state any large-mouth black bass, small-mouth black bass, warmouth bass, white bass, calico or strawberry bass, crappie, blue-gill, sunfish, green sunfish, brook or speckled trout, rainbow trout, brown trout, Loch Leven trout, muskellunge or sturgeon, or to sell, offer for sale or to possess at any time any of said fish taken in said manner. Any such fish found in such net, device or gear shall at once be returned to said waters with as little harm as possible to said fish. It shall be unlawful to take or catch any sturgeon at any time in any manner in said waters.

Sec. 116. It shall be unlawful for any person, firm, or corporation to set or use nets in any of the waters of Lake Michigan within the jurisdiction of this state without marking the location of and identifying said nets by marking with buoys and attaching to the buoys flags at least four feet above the surface of the water and showing on the buoys the license number of the person, firm, or corporation using such nets.

Sec. 117. The title to any and all fish taken from Lake Michigan in violation of the provisions of this act shall not vest in the taker thereof, but shall remain in the State of Indiana, and such fish shall be seized, forfeited and confiscated in the name of the State of Indiana by the Director and shall be sold and disposed of as the Director shall direct and the proceeds thereof shall be paid to the state treasury as part of the fish and game propagation and protection fund.

Sec. 118. All offal or filth of any description, whatsoever, accruing from the catching, curing, cleaning, or shipping of fish in or near waters of Lake Michigan shall be burned, buried, or otherwise disposed of in such sanitary manner as not to pollute such

waters and as not to be or become detrimental to public health or comfort.

Sec. 119. It shall be unlawful for any person to take, catch, or kill, or attempt to take, catch, or kill from that part of the Wabash River which forms a common boundary line between the states of Indiana and Illinois, any fish, by means of any hoop-net, fyke-net, basket-net or trap-net from the fifteenth day of April until the first day of June of any year, both dates inclusive, or any fish by means of any seine at any time from the twenty-fifth day of April to the fifteenth day of July of any year, both dates inclusive.

Sec. 120. It shall be lawful for any person, after having first procured a license and tags as in this act provided, to use in, and possess not more than one mile from that part of the Wabash River which forms the common boundary line between the states of Indiana and Illinois, the following described seines and nets, only:

(a) Any dip-net, hoop-net, fyke-net, basket-net or trap net having a mesh not less than one (1) inch.

(b) Any hoop-net or fyke-net which is not more than two hundred (200) yards in length or which obstructs not more than one-half of the width of the river.

(c) Any seine which does not exceed one thousand yards in length provided, however, it shall be unlawful to use any seine of greater length than two hundred (200) yards except under supervision of the Director or his authorized agents.

(d) Any seine having a mesh of not less than two and one-half ($2\frac{1}{2}$) inches or of such a length as to obstruct not more than one-half of the width of the river.

(e) The possession or use of any seine, dip-net, hoop-net, fyke-net, basket-net, or trap-net without the seal and tags affixed thereto as required by this act shall be unlawful and such seines or nets shall be seized and confiscated by the Director.

Sec. 121. It shall be unlawful for any person to take, catch, or kill in that part of the Wabash River which forms a common boundary line between the states of Indiana and Illinois, by means of any trap or seine duly licensed and tagged under the provisions of this act, any bull-head catfish less than eight (8) inches in length, or any white perch less than ten (10) inches in length.

Sec. 122. It shall be unlawful for any person to take, or catch or attempt to take or catch from that part of the Wabash River which forms a common boundary line between the states of Indiana and Illinois any bass (black, rock, white, or striped), any variety of trout, crappies, perch (yellow or ringed), sunfish, goggle-eye or blue-gill by means of any net, trap, or seine licensed and tagged under the provisions of this act, and any such fish so taken shall be immediately returned to the waters from which taken without unnecessary injury.

Sec. 123. (a) It shall be unlawful for any person to use, set, or cause to be used or set, take or attempt to take any fish by means of any net, trap, or seine licensed and tagged under the provisions of this act within one hundred (100) feet of any dam which wholly or partly crosses the Wabash River where it forms a common boundary line between the states of Indiana and Illinois.

(b) It shall be unlawful to set, fish with, or use any licensed and tagged D-net or hoop-net within one hundred (100) feet of any dam in any part of the Wabash River lying wholly within the State of Indiana, and extending from the corporate limits of the city of Lafayette to the place where the western boundary line intersects the Wabash River.

Sec. 124. (a) It shall be lawful for any person, after having first procured a license and tags as provided in this act, to use in, and possess not more than one mile from that part of the Wabash River lying wholly within this state and extending from the corporate limits of the city of Lafayette to the place where the western boundary line of the State of Indiana intersects the Wabash River, any D-net or hoop-net made of twine or cord, having a minimum width of mesh of one and one-half ($1\frac{1}{2}$) inches, measured from knot to knot, and having no wings.

(b) The possession or use of any D-net or hoop net without tags affixed thereto as required by this act shall be unlawful and such nets shall be seized and confiscated by the Director.

(c) It shall be unlawful to use or set any licensed net within one hundred (100) yards of the mouth of any stream emptying into the Wabash River from the Indiana side, or within the boundaries of said state.

Sec. 125. It shall be unlawful for any person to take, or catch, or attempt to take or catch, from that part of the Wabash River lying wholly within the State of Indiana and extending downstream from the corporate limits of the city of Lafayette to the place where the western boundary line of this state intersects the Wabash River, any fish by means of any licensed D-net or hoop-net from the fifteenth day of April to the first day of June of any year, both date inclusive.

Sec. 126. It shall be unlawful for any person to take, catch, or kill from that part of the Wabash River lying wholly within

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this state and extending downstream from the corporate limits of the city of Lafayette to the place where the western boundary of this state intersects the Wabash River by means of any net or trap duly licensed and tagged under the provisions of this act, any bull-head catfish less than eight (8) inches in length, other catfish less than twelve (12) inches in length, or any white-perch less than ten (10) inches in length.

Sec. 127. It shall be unlawful for any person to net, trap, or catch by means of any such licensed D-net or hoop-net in that part of the Wabash River lying wholly within this state and extending downstream from the corporate limits of the city of Lafayette to the place where the western boundary line of this state intersects the Wabash River, any black bass, rock bass, silver bass, white bass, blue-gill, crappie, jack-salmon, or pike-perch or wall-eye pike, or to retain or possess any fish of such species taken or caught with such net or trap, and any fish of any of such species herein enumerated so taken or caught unintentionally shall be returned immediately to the water without unnecessary injury.

Sec. 128. It shall be lawful for any person, after having first procured a license and tag as in this act provided to possess and use, under the provisions of this act, any gill-net for taking cisco from any of the lakes of this state.

Sec. 129. It shall be unlawful for any person to take, by means of any gill-net duly licensed and tagged under the provisions of this act, any cisco from the first day of January to the thirty-first day of October, both dates inclusive.

Sec. 130. On or before the fifteenth day of January, any net licensed and used under the provisions of this act shall be delivered by the person licensed to possess and use the same, to the Director until the legal time such net may be used shall have again arrived, at which time such net may be delivered to the owner thereof or to his agent, upon application to the Director and the payment of the license fee for the use of such net during the ensuing open season. It shall be unlawful for any person to use any gill-net licensed and tagged under the provisions of this act in such a manner that the bottom of the net is more than fifteen (15) feet below the surface of the water.

Sec. 131. It shall be the duty of the licensee, under the provisions of this act, to strip or otherwise remove the milt and spawn from each cisco, as it is taken from the net, and to return such milt or spawn to the waters from which the cisco was taken.

Sec. 132. It shall be unlawful for any person to take, catch, or kill, in any manner, in this state, any frog from the first day of May to the fifteenth day of June of any year, both dates inclusive.

PART VI. MUSSELS—REGULATIONS.

Sec. 133. It shall be unlawful for any person to take or catch from the waters of this state, or to possess, or to sell or offer to sell, any mussel or mussel shell less than two inches in size, measured in greatest dimension. Any mussel of smaller size than above provided unintentionally taken in the ordinary course of clamming shall be immediately culled and returned to the water whence taken without avoidable injury.

Sec. 134. It shall be unlawful for any person to operate at one time on the waters of the State more than one boat or one rig for taking or catching mussels. But such person may use one additional boat for the purpose of towing only when no apparatus for taking or catching or killing mussels is used or kept thereon.

Sec. 135. (a) It shall be unlawful for any person or persons to use or possess, in the waters of this state while taking or catching mussels, any crowfoot bar or any dredge, fork, shovel, or spade, or any other device used in scraping, digging, spading, or otherwise disturbing the bed of any of the waters of this state during the period from the first day of April to the thirtieth day of June, both dates inclusive.

(b) The provisions of this section shall not apply to that part of the Wabash River which lies within this state and extends from the corporate limits of the city of Lafayette to the place where the western boundary of this state intersects the Wabash River.

(c) It shall be unlawful for any person, at any time, while engaged in taking or catching mussels, to possess more than four crowfoot bars, or to have more than two crowfoot bars in such waters at any one time, and no such bar so possessed shall exceed twenty feet in length, or to use or possess a dredge, the length of the opening of which is more than three feet or which has prongs or forks more than four (4) inches in length.

Sec. 136. (a) The Director is hereby authorized to prescribe and designate by regulation or order areas or parts of waters of this state as breeding grounds for mussels from which area or parts of waters mussels shall not be taken for such period of time

as may be fixed by the Director; but no such period shall exceed five (5) years in any period of ten (10) years; nor shall more than one-half of the mussel-producing waters of the state be so closed at the same time; nor shall less than twenty miles in length of one stream (if such stream be that long) be so designated and prescribed and closed at one time; nor shall more than twenty-five miles in any distance of fifty miles in length of any one stream be so prescribed and designated and closed at any one time.

(b) Notice of such regulation or order of the Director shall be published once in a daily newspaper of general circulation published in each county in which such closed area or part thereof shall be located, or if there is no daily newspaper published in any such county, then in the weekly newspaper published in such county having the largest circulation therein, which publication shall be made not less than thirty (30) days before the taking effect of such regulation or order. Such regulation or order may be revoked, rescinded, amended or modified by the Director at any time upon publication of notice thereof as aforesaid.

(c) It shall be unlawful for any person to take, catch, or kill mussels or mussel shells in any area or parts of the waters of this state so prescribed and designated and closed during the time so fixed by the Director in said order or regulation.

Sec. 137. As used in this act the term "mussel" shall mean the pearly fresh-water mussel or clam, or naiad, and the shell thereof. "Crowfoot bar" shall mean a bar of any material bearing a series of hooks designed to catch or adapted for catching mussels by the insertion of such hooks between the shells of mussels. "Dredge" shall mean any mechanism of capture which is adapted for dragging the bottom of waters, operated with or without mechanical power, except the crowfoot bar. "Person" shall mean and include both natural persons, partnerships, and corporations.

PART VII. MISCELLANEOUS AND GENERAL PROVISIONS FOR PROTECTION AND PROPAGATION OF FISH, FROGS, AND MUSSELS.

Sec. 138. It shall be unlawful for any person to stretch, place, or set any obstruction other than a dam across any of the streams or rivers of this state which prevents the fish from ascending or descending any such stream or river.

Sec. 139. It shall be unlawful for any person to fish with, use, or set any trot line, set line, or throw line within fifty (50) yards of any dam in any of the waters of this state.

Sec. 140. It shall be unlawful for any person to fish in any pond or any fish hatchery owned, controlled, or supervised by the State of Indiana or the United States, or to take, catch, injure, or kill, or attempt to take, catch, injure, or kill any fish in any such hatchery pond.

ARTICLE V. DISCRETIONARY ORDERS—ABRIDGING OPEN SEASONS—DECREASING BAG LIMITS—REGULATING METHODS OF TAKING.

Sec. 141. The open season for and the bag limits on fish, frogs, mussels, game, fur-bearing animals and game birds, and the regulations for taking or killing thereof, which are by this act or may hereafter be established by law, are hereby fixed and declared to be the lawful open seasons for and the bag limits on fish, frogs, mussels, game, fur-bearing animals, and game birds, and the regulations for taking or killing thereof, within the meaning and for the purposes of this act, except only as such open seasons may be suspended or abridged, or such bag limits modified or decreased, and the taking or killing thereof regulated in the manner and for the purposes hereinafter provided.

Sec. 142. The Director of this state is hereby authorized and empowered, in accordance with the provisions of this act, to suspend or abridge the open seasons and to modify or decrease the bag limits otherwise provided by law for the taking, killing, hunting or pursuing of any particular kinds or species of fish, frogs, mussels, game, fur-bearing animals, or game birds in any designated waters or areas of this state, or to regulate the taking or killing thereof in said waters or areas, whenever he shall determine that such particular kinds or species of fish, game, or fur-bearing animals or game birds are threatened from any cause or causes with depletion or extermination in said waters or areas, or shall determine that such action is necessary for the proper protection or propagation of such kinds or species of fish, frogs, mussels, game, fur-bearing animals, or game birds in said waters, or areas. Such determination shall be made only after thorough investigation, and shall be based upon reliable data relative to the quantities of such particular kinds or species of fish, frogs, mussels, game, fur-bearing animals, or game birds in such designated waters or areas, the volume of hunting and fishing practiced therein, and climatic, seasonal and other conditions affecting the protection, preservation and propagation of such particular kinds or species in such waters or areas.

Sec. 143. (a) Whenever the Director shall determine that any kinds or species of fish, frogs, mussels, game, fur-bearing animals, or game birds are threatened with depletion or exter-

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mination in any designated waters or areas, or shall determine that such action is necessary for the proper protection or propagation of such kinds or species in such waters or areas, as provided in Section 142 of this act, the Director shall forthwith make and promulgate such order or orders regulating the taking or killing of, and/or suspending or abridging the open seasons and/or decreasing or modifying the bag limits otherwise provided by law for the taking, killing, hunting or pursuing of, such kinds or species of fish, frogs, mussels, game, fur-bearing animals, or game birds in said waters or areas as in the judgment of the Director, based upon investigation made as provided in Section 142 of this act, may be necessary or expedient for the protection and/or propagation of the same in such waters or areas.

(b) Any and all such orders shall clearly and specifically describe and set forth the waters or areas affected thereby, the length of time for which such order is to remain in force, which shall in no case exceed five (5) years, the kinds or species of fish, frogs, mussels, game, fur-bearing animals or game birds to which such orders are applicable, and the suspension or abridgment of open seasons and/or the decrease in bag limits, and/or the regulations for the taking or killing thereof so ordered.

(c) Each order so issued shall be placed on file in the office of the Director.

(d) A certified copy of such order shall be sent by registered mail, to the clerk and sheriff of each county, the whole or any part of which is affected by such order, not less than fifteen (15) days before the taking effect of such order.

(e) Each sheriff receiving a certified copy of such order, shall post the same in a conspicuous place at the court house where such other legal notices are posted, notice of such order. Proof of such posting shall be made by the sheriff to the Director within five (5) days after receipt of the certified copy of such order, on forms prescribed by the Director.

(f) Each clerk, on receipt of a certified copy of such order, shall post the same in a conspicuous place in his office where licenses are issued.

(g) The Director shall cause to be posted in two conspicuous places in each township affected, notice and a copy of such order, fifteen (15) days before taking effect of such order.

(h) A copy of each such order, so long as it remains in force and effect, shall be included and printed in each official compilation of the Indiana Fish and Game Laws.

(i) All such orders shall be issued under the seal of the Conservation Department; shall bear the signature or facsimile thereof of the chief administrative officer of the Conservation Department and shall be countersigned by the Director.

Sec. 144. Whenever in the judgment of the Director any order issued under the provisions of this act, shall be deemed no longer necessary, he shall issue an order rescinding or modifying such original order, in the same manner as such original order was issued, as provided in Section 143 of this act.

Sec. 145. Upon the adoption and promulgation of any order or regulation by the Director of this state, as provided by this act, the open seasons and/or bag limits, and/or the regulations for taking or killing thereof, as otherwise provided by law for the kinds or species of fish, frogs, mussels, game, fur-bearing animals, or game birds designated in such order are hereby suspended, abridged, modified, or decreased to conform with the terms of such order or regulation and shall continue to be so suspended, abridged, modified, or decreased so long as such order or regulation continues in force and effect; Provided, however, that upon the repeal, rescission, or expiration of such order or regulation, any and all such open seasons and/or bag limits and/or regulations for taking or killing thereof that shall have been so suspended, abridged, modified, or decreased by such order or regulation shall thereafter be and remain in as full force and effect as though such order or regulation had not been issued, except as such open seasons and/or bag limits and/or regulations for taking or killing thereof may be suspended, abridged, modified, or decreased by further or subsequent orders or regulations issued pursuant to the provisions of this act.

Sec. 146. Any person who shall take, catch, kill, hunt, pursue, or possess any fish, frogs, mussels, game, fur-bearing animal, or game bird contrary to or in violation of any of the terms or provisions of any order or regulation of the Director made and promulgated as in this act provided, and during the time said order or regulation shall remain in force and effect, shall be deemed guilty of a misdemeanor, upon conviction thereof, shall, for the first offense, be punished by a fine of not less than ten (\$10.00) dollars or more than one hundred (\$100.00) dollars to which may be added imprisonment in the county jail not to exceed sixty (60) days, and for each and every subsequent offense by such person when charged as such, shall be punished by a fine of not less than

fifty (\$50.00) dollars or more than two hundred fifty (\$250.00) dollars, to which may be added imprisonment in the county jail where said conviction is had for not less than twenty or more than ninety days.

Sec. 147. The term "waters" as used in this act shall be deemed and construed to mean and include any single or individual lake, stream, river, pond, or other single or individual body of water or any part or portion thereof, and any and all chains, systems or combinations of the same, in any township, townships, county or counties within this state. The terms "area" and "areas" as used in this act shall be deemed and construed to mean and include the whole of the state, or the whole or any designated portion of any township, or townships, county, or counties within the state. The term "open season" as used in this act shall be deemed and construed to mean that period of time during which it is lawful to take, catch, kill, hunt, or pursue fish, frogs, mussels, game, fur-bearing animals and game birds, protected by the laws of this state. The term "bag limits" as used in this act shall be deemed and construed to mean that number or quantities of fish, frogs, mussels, game, fur-bearing animals and game birds that may be lawfully taken, caught, killed or possessed as now prescribed by law during any open season.

Sec. 148. Any and all orders, rules, and regulations issued and promulgated under any prior act of the Indiana General Assembly for the protection or propagation of fish, wild birds, and wild animals shall remain in full force and effect unless the same shall be specifically repealed, rescinded, or modified by this act, or by an order issued and promulgated as provided in this act.

ARTICLE VI. GENERAL AND MISCELLANEOUS PROVISIONS

Sec. 149. The provisions of this act shall not apply to the Director, Game Wardens, Deputy Game Wardens, officers, agents, or employees of the Conservation Department, or police officers of the United States or State of Indiana while in performance of their official duty.

Sec. 150. (a) The term "resident" as used in this act shall be construed to mean in the case of a natural person, a person who is at the time and who has been continuously for a full period of six months preceding the date of application for a license or permit issued under the provisions of this act a bona fide resident of this state; or in the case of a firm or a partnership, one in which a majority of its members are at the time of application and have been continuously for a full period of six months next preceding the date of application for such license or permit, bona fide residents of this state, or in case of a corporation, one organized under the laws of this state and having its principal office in this state. All other persons, firms, and corporations are nonresidents. Proof that any natural person is not a qualified voter of the county in which he claims residence shall constitute prima facie evidence that such person is not a resident of this state within the meaning of this act.

(b) The word "Director" as it is used in this act shall be construed to mean the Director of the Division of Fish and Game of the Department of Conservation.

(c) The term "person" or "persons" as it is used in this act shall be construed to mean and include natural persons, partnerships, and corporations.

Sec. 151. Any and all license fees and any and all monies taxed and collected by, or coming into the hands of the Director pursuant to, or by virtue of any of the provisions of this act shall be paid into the state treasury and shall become a part of the Fish and Game Protection and Propagation Fund, and said fund shall be expended in the propagation of, protection, and purchase of fish, frogs, mussels, wild birds, wild animals, or game, and all other expenses connected therewith.

Sec. 152. In all cases of conviction, or pleas of guilty of violating any of the provisions of this act, or any act in relation to or for the propagation or protection of fish, game, fur-bearing animals, or wild birds, mussels, or frogs there shall be taxed against each defendant so convicted, in favor of the Division of Fish and Game of the Conservation Department a fee of five (\$5.00) dollars as part of the costs. Said fee shall be promptly paid by the justice or other officer collecting the same to the Director of the Division of Fish and Game of the Conservation Department who shall pay such fees into the state treasury and there such fees shall become a part of the Fish and Game Protection and Propagation Fund.

Sec. 153. It shall be unlawful for any nonresident of the State of Indiana falsely to represent to any officer or agent authorized to issue any license under this act, that he, said nonresident, is a resident of Indiana, for the purpose of procuring a resident license under this act. Any license so procured shall be absolutely void and shall confer no right or privilege to engage in the pursuit mentioned therein.

FISH AND GAME LAWS RECODIFIED

Sec. 154. The Attorney General of the State of Indiana is hereby granted concurrent power with the several prosecuting attorneys of this state to enforce any and all of the provisions of this act, including the power to approve and file any affidavit charging any violation of law hereunder.

Sec. 155. (a) It shall be unlawful for any person, firm, or corporation to take, carry, ship, transport or accept for shipment or transportation beyond the limits of this state any wild bird or wild animal or fish, frogs, or mussels protected by any law of this state except as in this act provided.

(b) Any person having a valid license to use any commercial fishing device in this state may ship, carry, or transport any fish which he may, and has, legally taken or caught by such commercial fishing devices under provisions of this act, beyond the limits of this state.

(c) Any person having a nonresident license to hunt, trap, or fish in this state may carry, transport or ship beyond the limits of this state, in open season, in any one day, any game bird, game animal, or fish, frogs or mussels that he has lawfully taken in open season, not to exceed in number the maximum lawful possession limit of any such game bird, game animal, or fish, frogs or mussels. It shall be unlawful for any person having license to hunt, trap, or fish to ship, carry, or take beyond the limits of this state in one week more than twice the maximum lawful possession limit of any such game bird, game animal, or fish, frogs or mussels permitted by law for one person at any one time.

(d) Hides and furs of furbearing animals legally taken in open season may be shipped or carried beyond the limits of this state in any numbers during the open season, or within five days after the last day of the open season.

(e) Any person having a breeder's license may ship, carry, or transport beyond the limits of this state any game bird or game animal which he may and has lawfully possessed under such breeder's license in this state.

(f) It shall be unlawful for any person, firm, or corporation to ship, carry, or transport, or accept for transportation or shipment to any place within this state or beyond the limits of this state any game bird, game animal, fish, frogs or mussels unless such game birds, game animals, fish, frogs or mussels are enclosed in a package or container on which there shall be clearly, legibly, and conspicuously marked on the outside thereof the name and address of the shipper and of the consignee and an accurate statement of the number or quantities and kinds of birds, animals, fish, frogs or mussels contained therein, and such shipper shall produce the license required under the provisions of this act authorizing such person to take or possess such game birds, game animals, fish, frogs or mussels; or if carried by said licensee personally, such game bird, game animal, fish, frogs or mussels shall be carried openly for inspection, together with his license.

(g) Any person having a mussel license may ship lawfully taken mussels or mussel shells beyond limits of the state, as herein provided.

Sec. 156. (a) All licenses, permits, certificates, seals, tags, orders, and regulations, whatsoever, required or authorized by any provisions of this act, shall be in the form prescribed by the Director, unless herein otherwise provided.

(b) Any and all regulations or restrictions which the Director is by this act authorized to make or prescribe, and incorporate in or attach to any license or permit issued under the provisions of this act shall be construed to mean and include only such regulations or restrictions as may be necessary and proper for adequate protection or propagation of wild birds, wild animals, fish, frogs, or mussels, or otherwise to promote the general purpose of this act.

Sec. 157. Any person violating any provision of this act for which no specific penalty is hereinbefore provided shall be deemed guilty of a misdemeanor and upon conviction shall be punished, for the first offense, by a fine in any sum not less than ten (\$10.00) Dollars or more than one hundred (\$100.00) Dollars, to which may be added imprisonment in the county jail not to exceed sixty (60) days, and for any subsequent violation of any provision of this act for which no specific penalty is hereinbefore provided such person shall be deemed guilty of a misdemeanor and shall upon conviction be fined not less than twenty-five (\$25.00) dollars or more than two hundred and fifty (\$250.00) dollars, to which may be added imprisonment in the county jail not to exceed sixty (60) days. The taking, catching, killing, possession, sale, barter, purchase or offer, to purchase, or transportation of each bird, animal, or fish, frog, mussel, or part thereof, or the possession of each fishing, hunting, or trapping apparatus, appliance, or device in violation of any provision of this act shall constitute a separate and distinct offense. Each day's possession of any wild bird, wild animal, or fish, frog, mussel, or each day's

possession of any fishing, hunting, or trapping apparatus, appliance, or device, the possession of which is prohibited by this act, shall constitute a separate and distinct offense. Two or more offenses may be joined in the same affidavit or indictment, and the person so offending, if convicted, shall be fined and punished for each offense as provided by this act.

Sec. 158. Any person having procured a license or permit required under the provisions of this act shall have his license or permit on his person when engaged in the respective pursuit for which he is licensed or for which such permit was issued, and shall then and there produce and exhibit the same, upon request of any officer authorized to enforce the provisions of this act or any of the laws of this state for propagation and protection of game, fur-bearing animals, birds, fish, frogs or mussels and such license and permit, unless so carried, and unless so produced and exhibited, shall not have the effect to have authorized any such person to engage in such pursuit. Any license or permit issued under provisions of this act shall not be assignable or transferable, unless herein specifically provided. It shall be unlawful for any person to change, alter, or counterfeit any license or permit issued under provisions of this act.

Sec. 159. If any phrase, clause, sentence, section or other part of this act shall be declared unconstitutional or invalid for any cause, such decision shall affect only the phrase, clause, sentence, section or other part of this act which shall be directly in controversy, and the validity of the entire remainder of this act shall in no way be affected thereby.

Sec. 160. No caption of any section, article, or part of this act shall in any way effect the interpretation of this act, or any part thereof.

Sec. 161. All laws and parts of laws in conflict with any of the provisions of this act are repealed, and the following acts and parts of acts and all acts amendatory thereof and supplemental thereto are hereby expressly repealed:

Sections 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, and 210 of an act entitled "An Act concerning public offenses and their punishment," approved April 14, 1881.

An act entitled "An Act to authorize the appointment of a Commissioner of Fisheries for the State of Indiana, defining his duties, and making an appropriation to defray the expenses thereof," approved March 26, 1881.

An act entitled "An Act providing for the construction and repairing of fish ladders, defining certain misdemeanors, providing penalties, and declaring an emergency," approved March 5, 1885.

An act entitled "An Act conferring the powers of constables on road supervisors, in certain cases, and describing the same, and affixing a penalty for failure to discharge such duties." Approved March 11, 1889.

An act entitled "An Act for the protection of fish in private ponds, and providing the penalty for the violation of this provision," approved February 8, 1899.

An act entitled "An Act to authorize the appointment of a Commissioner of Fisheries and Game for the State of Indiana, defining his duties, making an appropriation to defray the expenses thereof, and repealing an Act entitled 'An Act to authorize the appointment of a Commissioner of Fisheries and Game for the State of Indiana, defining his duties and making an appropriation to defray the expenses thereof,' approved March 26, 1881, and declaring an emergency," approved February 13, 1899.

An act entitled "An Act to regulate the taking of fish in waters of this state; to protect the waters of this state from pollution; granting certain powers to officers relative to the enforcement of the fish and game laws; providing penalties for violation of its provisions; repealing all laws in conflict therewith and declaring an emergency," approved February 28, 1899.

An act entitled "An Act to regulate the taking of fish in the waters of the state, to protect the waters of this state from pollution, regulating matters properly connected therewith, providing penalties for violations of the provisions of this act, repealing all laws or parts of laws in conflict herewith," approved March 2, 1901.

An act entitled "An Act for the better protection and preservation of game of the State of Indiana, requiring certain persons to take out license to hunt, creating a fund for the better protection and preservation of game and fish, providing penalties for a violation of this act or any of its provisions, regulating matters properly connected therewith, repealing conflicting laws and declaring an emergency," approved March 11, 1901.

An act entitled "An Act to protect certain birds of the pheasant kind in the State of Indiana, repealing an act to protect certain birds of the pheasant kind in the State of Indiana, approved February 17, 1899, and declaring an emergency," approved February 24, 1905.

Sections 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619,

FISH AND GAME LAWS RECODIFIED

620, 621, 622, 623, 624, 625, 626, 626½ of an act entitled "An Act concerning public offenses," approved March 10, 1905.

An act entitled "An Act prohibiting ice fishing in certain lakes of this state, providing penalties for the violation thereof, repealing all laws in conflict therewith and declaring an emergency," approved February 21, 1907.

An act entitled "An Act to protect certain game birds in the State of Indiana, and making it unlawful to hunt on game preserves organized and stocked with such game birds. Providing penalties for the violation thereof and repealing an act entitled 'An Act to protect certain birds of the pheasant kind in the State of Indiana,' approved February 17, 1899, and declaring an emergency," approved March 6, 1909.

An act entitled "An Act providing for the protection of certain wild fur-bearing animals," approved February 2, 1911.

An act entitled "An Act to protect squirrels within or near public parks or grounds," approved March 2, 1911.

An act entitled "An Act concerning licenses to fish and hunt and prescribing duties of certain officers in connection therewith," approved March 7, 1911.

An act entitled "An Act to prohibit the use of ferrets in hunting rabbits or any other species of game in the State of Indiana," approved February 12, 1913.

An act entitled "An Act concerning public offenses and providing penalty," approved February 24, 1913.

An act entitled "An Act for the preservation of the fish and game of the state, defining certain offenses in reference thereto, and prescribing penalties for the violation thereof, and other matters incident thereto, and declaring an emergency," approved March 8, 1913.

An act entitled "An Act exempting old soldiers from the requirements for hunting and fishing licenses," approved March 3, 1915.

An act entitled "An Act concerning the keeping and disposing of birds and animals reared and bred in captivity," approved March 3, 1915.

An act entitled "An Act to prohibit the use of searchlights or other artificial lights attached to automobiles, in hunting, and making it unlawful to shoot across, along or upon a public highway, and providing penalties therefor," approved March 5, 1915.

An act entitled "An Act regulating the hunting of certain game birds in the state," approved March 9, 1915.

An act entitled "An Act for the protection of fish in Lake Michigan," approved February 28, 1917.

An act entitled "An Act concerning the protection and propagation of trout and providing for the closure of certain waters of the state for trout breeding grounds, and providing penalties," approved February 28, 1917.

An act entitled "An Act providing for the regulation of trapping and for the protection of fur-bearing animals and providing penalties for violation of the same, and repealing all laws and parts of laws in conflict with the provisions of this act," as passed at the 70th Session of the General Assembly of the State of Indiana in 1917, and published in the Acts of the General Assembly of 1917 at page 438 and which Act became a law without the signature of the Governor.

An act entitled "An Act prohibiting the harboring and possession of ferrets without procuring a permit therefor, and authorizing the department of conservation to issue such permits," approved February 17, 1921.

An act entitled "An Act to establish a closed season for black bass and blue gills, making it unlawful to possess black bass and blue gills during such closed season, providing for penalties for violation of this act, and providing for an emergency," approved February 24, 1921.

An act entitled "An Act to regulate fishing through the ice in the lakes of this state and providing penalty," approved March 4, 1921.

An act entitled "An Act to provide for the issuance of permits to soldiers, sailors and marines who are not required by law to obtain hunting and fishing licenses," approved February 14, 1925.

An act entitled "An Act concerning fish, game, wild birds, wild animals, and offenses relating thereto," approved March 1, 1927.

An act entitled "An Act for the protection of the American or Bald Eagle and its nest and eggs, and providing penalties for violation of this act," approved March 11, 1927.

An act entitled "An Act to regulate the taking of mussels and mussel shells in the waters of this state," approved March 11, 1927.

An act entitled "An Act for the protection of fish, the preservation of the fisheries and the regulation of the taking of fish, in the waters of Lake Michigan within the jurisdiction of Indiana," approved March 13, 1929.

An act entitled "An Act to regulate fishing with trot lines or set lines in the waters of this state, providing penalties, and repealing all laws in conflict, and declaring an emergency," approved March 4, 1931.

An act entitled "An Act concerning the licensing of buyers of the hides, skins and furs of fur-bearing animals," approved March 12, 1931.

An act entitled "An Act for the protection of raccoon," approved March 9, 1933.

An act entitled "An Act concerning the use of fish nets and traps in certain prescribed portions of the Wabash River, providing for the licensing thereof and prescribing penalties for the violation of the provisions hereof," approved March 9, 1933.

An act entitled "An Act to license and regulate the buying of hides, skins and furs of fur-bearing animals," approved January 30, 1935.

An act entitled "An Act granting the Division of Fish and Game of the Conservation Department the power to authorize the possession, out of season, of any game bird, game animal or fur-bearing animal as a pet," approved January 30, 1935.

An act entitled "An Act to permit the taking of cisco by the use of gill nets in the waters of this state, providing for the licensing and regulation of such fishing and fishing nets by the Division of Fish and Game of the Conservation Department, and prescribing penalties for the violation thereof," approved January 30, 1935.

An act entitled "An Act concerning the harboring, possession use, sale, delivery, and transportation of ferrets, prohibiting the use of ferrets, certain other small animals and mechanical devices in hunting, taking and catching rabbits or any other species of game, prescribing penalties for the violation thereof; and repealing certain acts in conflict therewith," approved January 31, 1935.

An act entitled "An Act to provide for better protection and preservation of fish, game and fur-bearing animals and game birds, protected by the law of this state; and to provide a method by which the taking, killing, hunting or pursuing thereof may be further restricted, and the open season for the taking, killing, hunting, or pursuing thereof suspended or abridged, and the bag limit modified or decreased in any designated waters or areas of this state; providing penalties for the violation thereof, and declaring an emergency," approved February 1, 1935.

An act entitled "An Act to amend section 1 of an act entitled 'An Act regulating the hunting of certain game birds in the state,' in force March 9, 1915," approved February 11, 1935.

An act entitled "An Act granting the division of fish and game of the conservation department the power to issue permits to possess and purchase fish, game and fur-bearing animals for breeding purposes," approved February 19, 1935.

An act entitled "An Act concerning the taking, trapping, shooting, killing and possessing of fox and prescribing penalties for the violation thereof," approved March 12, 1935.

An act entitled "An Act concerning the taking of fish by nets from the Wabash river where it forms the common boundary line of the State of Indiana and the State of Illinois," approved March 12, 1935.

FISH AND GAME LAWS NOT REPEALED

	Acts	B's. Sts.
Fish hatcheries of U. S.	1913	11-103
Migratory Bird Reservations.	1931	11-909
Live minnow Permits.	1935	11-638
Revocation of Licenses.	1935	11-311
Water Vegetation Removal.	1935	11-1201
Flow of water over dams.	1935	11-1101
Hunting without Owner's consent.	1905	11-541
Injury to property while hunting.	1905	11-542

No one is exempt from having a hunting license or permit, except when hunting upon their own property.

Wanton destruction of owls is both illegal and uncalled for; only the great horned owl is a continual game and song bird poacher.



Quips and Queries.



THIS page will appear each month with short items and interesting articles of practical value regarding Fish and Game, State Parks, Forests, Forestry, Entomology, and Highways. Questions will be answered when accompanied by a stamped, addressed envelope. Ten questions will be published each month. Address questions to this Department and confine all letters to one question or subject.

Help Make This Page Interesting — Send in Your Questions

1. KENNEL LICENSE.

QUES.—Does the Department of Conservation issue kennel licenses?

ANS.—No. During the last session of the Legislature, the duty of issuing kennel licenses was transferred from the Department of Conservation to the County Assessors.

2. CONSERVATION LAWS.

QUES.—When will the laws pertaining to conservation, enacted by the last session of the Legislature, go into effect?

ANS.—With the exception of those bills which carried emergency clauses, all Legislation will go into effect when promulgated by the Governor. The conservation laws did not carry emergency clauses.

3. DOGWOOD, REDBUD.

QUES.—We are contemplating a drive through southern Indiana. When will the Dogwood and Redbud be in bloom?

ANS.—Both the Flowering Dogwood (*Cornus florida*) and the Redbud (*Cercis canadensis*) bloom throughout southern Indiana in April. They greatly enhance the beauty of the southern Indiana hills in the spring.

4. RAINBOW TROUT.

QUES.—At what time of the year do Rainbow trout ascend northern Indiana streams to spawn?

ANS.—Rainbow trout, (*Salmo shasta*) spawns in the early spring. They migrate upstream with rising water temperature, and many are undoubtedly on the move at the present time.

5. HAWKS.

QUES.—How can one tell the difference between "Hen-hawks" and "Blue-tails"?

ANS.—The so-called "Hen-hawks" are hawks with broad wings and broad, rounded tails, which habitually soar in wide circles, high in the air.

"Blue-tails" are the long-tailed hawks with short, rounded wings. They are woodland birds that do not often soar.

6. ARBOR DAY.

QUES.—On what date is Arbor Day this year?

ANS.—Arbor Day, the day appointed for the planting of trees and shrubs, this year falls on April 9th.

7. WOLF TREE.

QUES.—What is meant by a "wolf tree"?

ANS.—The name "wolf tree" applies to old trees in young stands of timber. The old trees utilize a large space and much shade preventing the growth of younger trees below. The forest will be improved if wolf trees are removed.

8. PIKE AND PERCH EGGS.

QUES.—Where are Wall-eyed Pike and Ringed Perch eggs, used in State Fish Hatcheries, obtained?

ANS.—Pike and Perch eggs are obtained from commercial fishermen operating on Lake Michigan in April. The eggs are stripped from the females, fertilized on the fishing boats, and sent immediately to the hatcheries.

9. WILDLIFE INSTITUTE.

QUES.—Are Conservation organizations in Indiana affiliated with the American Wildlife Institute?

ANS.—Yes. The 640 Conservation Clubs in Indiana are represented by one delegate to the Annual Wildlife Conference.

10. TERMITES.

QUES.—When do termites swarm?

ANS.—Termites, a destructive, wood-eating insect, resembling black ants with cellophane wings, swarm during April. Swarming indicates that a colony is already at work, and that control measures should be instituted at once.

Buy a Hunting and Fishing License and Use It for Health and Recreation



